


UNIVERSITEIT GENT

FACULTEIT POLITIEKE EN SOCIALE WETENSCHAPPEN

PUBLIC ORIENTED RISK COMMUNICATION IN THE NEW RISK SOCIETY

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A dissertation submitted in fulfillment of the requirements for the degree of Doctor (PhD) in Political and Social Sciences: Communication Sciences

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Academic year 2009-2010

For Helena and her Opa

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DANKWOORD

Duizenden woorden volgen nog, maar de belangrijkste, voor mij persoonlijk althans, staan vooraan. Het zijn woorden van dank aan mensen zonder wie de volgende duizenden woorden er anders nooit waren geweest. Vooreerst wil ik de leden van mijn examencommissie danken. Prof. Raeymaeckers, Prof. Verstraeten en Prof. Vyncke. Het eerste telefoontje met dr. Jan Gutteling heeft me een grote boost gegeven om de laatste loodjes te doorstaan. Vooral prof. Verleye, Gino, wens ik een hele speciale plaats in dit dankwoord toe te kennen. Zes jaar geleden werd ik in de leeuwenkooi van NB I geworpen voor 120 studenten. Nu zijn dat er 465, wat bewijst dat onze vakgroep alsmaar groeit. Dankzij u heb ik mijn methodologische en statistische kennisveld sterk verruimd en tevens mijn pedagogische en didactische vaardigheden aangescherpt. Dank u, Gino, voor de kennis die je me doorgaf, voor de zelfstandigheid die je stimuleerde en het positivisme en de zelfzekerheid uit me te halen. Ook mijn collega's ben ik ongelooflijk dankbaar voor de hele leuke en stimulerende omgeving: Evelien, Pieter, V., Steve, Laurence, Jeroen, Frederik, Elke, Fien, Stijn, Hannes, Olivier, Nicolas, Pieter U., Jeroen, Tim, Lieven. MICT'ers op de Korte Meer 7, eerste verdieping bis (Jan, Katrien, Cédric en Dimitri), bedankt voor alles en excuses voor het vele geklets van het vrouwelijk gezelschap een halve verdieping lager. Ook een speciaal dankwoordje voor Veva, Dieter, Liselot en Katarina, die ook altijd voor me klaar stonden. Sofie, je beseft het misschien maar half, omdat je gewoon zo bescheiden bent, maar je hebt echt veel betekend tijdens de laatste eindspurt. Jouw zeer kritische maar ook zeer constructieve kritieken en voorstellen hebben me soms een andere academische bril opgezet. Lieve Lies en Liesbet. Jullie zijn de allerbeste bureaugenoten. We hebben lief en leed gedeeld. Jullie zijn echt supergoede vrienden en ik ben zeker dat dit altijd zo zal blijven. Bedankt voor alles! Hetzelfde geldt voor Karolien – Poelie. Jij moet echt een mental coaching bedrijfje opzetten, je kan mensen motiveren als geen ander. Ook veel dank aan Sandy, Monique en Karen, die altijd voor me klaarstonden. Annelore wens ik toch ook een speciaal dankwoordje toe te sturen. Bedankt voor je vriendschap, zowel op het werk als in ons 'muziekske'. Beste vrienden - muzikanten. De absurditeit van de wekelijkse (of soms frequentere) repetities en afterparties zijn vast en zeker een bron van inspiratie geweest. Muziek is alles voor mij. Bedankt, allemaal! Speciaal ook aan de lopertjes (Fabienne, Eva, Rietje, Marjolein, Greet, Kathy, Annick en Els), aan wie ik tijdens de wekelijkse loop'trainingen' mijn verhalen kwijt kon. Ook een speciaal woordje voor Ze Quaffeurz. Tonny, Arvid, Hanske, Jimmy, Bart, Jantie, Emmanuel, Claude, Marjolein en Andy. Thank you for the music, en dat ik er deel van kan uitmaken.

Naast mijn muziekfamilie heb ik ook het geluk gehad om in het warme nest van de Sloovertjes terecht te komen. Lieve Berenice en Marcel, jullie zijn ook een beetje mijn mama en papa, bedankt voor alles, en vooral om zo goed voor onze kindjes te zorgen. Ook Kathy en Tonny, Vero en Kurt zijn echt mijn broers en zussen. Jullie positivisme en humor hebben me

dikwijls terug met mijn voetjes op de aarde gebracht. Bedankt ook aan mijn zus Catherine voor de lieve aanmoedigingsmails en -telefoontjes, ook al heeft ze het zelf zo ontzettend druk. Ook mijn nichtje Gianna moet in het lijstje komen. Je bent mijn kleine zusje, en ik ben ook heel erg fier op jou.

Mama, jij bent mijn schouder en mijn glimlach. Je leerde me rustig relativeren in woelige situaties. Dank je om mijn mama te zijn, en voor alles wat je voor ons doet. Hopelijk vinden we nu allebei wat meer tijd om nog meer leuke cliché mama-dochter-kleindochter dingen te doen.

Papa, weet dat ik dit doctoraat vooral aan jou opdraag. Het document dat hier ligt is niet enkel het resultaat van enkele jaren onderzoek. Het is de reflectie van wie ik ben, een evoluerend wezen die haar dynamiek te danken heeft aan de open geest waarin ze opgroeide. Bedankt voor alle kansen, voor bril die je me opzette als kind, voor de hand die je me toereikte als volwassene. Ik ben soms wel eens rebels geweest, maar zie daarin niets anders dan wat jij eigenlijk ook bent geweest, en altijd zal zijn.

Lieve Alice, ik heb je zien en helpen opgroeien van klein meisje dat net leerde schrijven tot jonge vrouw die een zeer mooie toekomst voor zich heeft. Ik ben ongelooflijk trots op mijn ‘stiefdochter’ of liever gezegd mijn Lizzy. Dank je, lieve meid, omdat je zo ongelooflijk je best hebt gedaan, omdat je zo lief voor me was, omdat je ons kleine pruts zo goed verzorgde in de weekends dat ik echt wel door moest gaan, en gewoon, omdat je bent wie je bent.

Kleine Helena. Jij bent vast de mooiste, liefste, positiefste maar meest intense uitdaging van mijn leven. Ik heb enorm veel appreciatie voor je sterke persoonlijkheid, die zich weliswaar soms wel op de minst gepaste momenten (vooral ’s nachts dan) liet zien. Maar ik neem het je niet kwalijk, je verdient alle aandacht van je mama. Al van dag één snakte je naar zelfstandigheid, ook al heb je ons toch zo nodig. Ooit zal je deze woorden kunnen lezen, en begrijpen.

Liefste Danny. Ik kreeg niet meer dan twee lijnen van je om uit te drukken wat zelfs niet op 500 pagina’s zou kunnen. Dat lukt me niet. ‘Come what may’ was onze slagzin, nu al meer dan 10 jaar geleden. Er is heel wat op ons afgekomen de laatste jaren, waarvan dit doctoraat eigenlijk wel één van de pittigste ervaringen was. Ook als ik ons, en jou, even bekijk van op een afstand, zie ik zoveel positivisme, zoveel energie, zoveel liefde. Ik heb zoveel respect voor jou, voor hoe jij het leven bekijkt en vooral voor hoe jij het soms ook niet bekijkt maar gewoon voelt en gelukkig bent met de allerkleinste dingen. Ik heb het je niet gemakkelijk gemaakt, maar de onvoorwaardelijkheid van onze liefde heeft het gehaald op de voorwaardelijkheid van de doctoraatsstress, noodzakelijke driver om te presteren maar toch zo uitputtend. Dank je, ventje, broerie, liefje, maatje.

Isabelle, 26 oktober 2009.

INTRODUCTION

Our contemporary society can be considered not only as a communication and information society, but also as a risk society. The current risk society does not only include 'old risks' such as natural disasters, it is also characterized by the emergence of the so called 'new risks', risks that are the consequence of a new post-industrial and technological society. We are confronted with new risks that are a result of the technological progress, such as hazards associated with nuclear energy, radiation of cell-phones, hazards related to genetically modified food etc. Other new risks, such as terrorism, have a more political or social nature. This contemporary risk society is also characterized by a commercialization of risks. We can actually label this mechanism as the 'risk of the risk society'. Increasingly more companies focus on the core business to sell certainty and threat-reducing or should we say perception reducing, products and services. There have never been as many risks before, or at least that is what a great portion of the population thinks. Risk perceptions are very often much more important than the risks as such, as these perceptions will influence the actual behaviour of people, and eventually have their impact on social, economical and political domains in the entire society. This introduction was written during the rise of the H1N1 virus, or the so called 'Mexican flu'. This case is a perfect example to introduce the readers to the concept of risk perception, risk communication and the ripple effects that are induced by various media. On March 18th, the competent authority (Interministriële Commisaris Influenza) announced the first victim of the H1N1 virus in Mexico. The virus was first labeled as the 'swine flu' but later renamed as Mexican flu referring to the geographical origin of the first casualties. The threat of this new virus did not lie within its mortal nature but especially within its high degree of contagiousness and the fact that the virus was resistant to all existing vaccines and anti viral medication (Tamiflu) were not fully effective. The worldwide attention and international concern with governments, combined with a fast and global media coverage induced general arousal. To illustrate: when the first contaminated person was confirmed in Belgium on 13th May 2009, the national press and television stations put a lot of attention to it, inviting experts and providing general guidelines to civilians through various media channels. Of course it is absolutely necessary to create a mental safety net to attenuate the communal fear and panic reactions. On 11th June 2009, the World Health Organization announced phase 6 of the general pandemic alert and announced the pandemic status of the H1N1 influenza virus. On 30th July, a twenty nine year old women had deceased after being infected with the virus, and on 14th October, a five year old passed away because of the complications that accompanied the H1N1 virus. These casualties might have caused even greater arousal and even fear with certain groups within the population. The government has communicated intensively on the evolution of the virus and the number of contaminations.

The weekly report for the period between 12th October and 18th October of the Belgian Institute for Public Health integrated the subjoined figures (ISP/WIV, 2009).

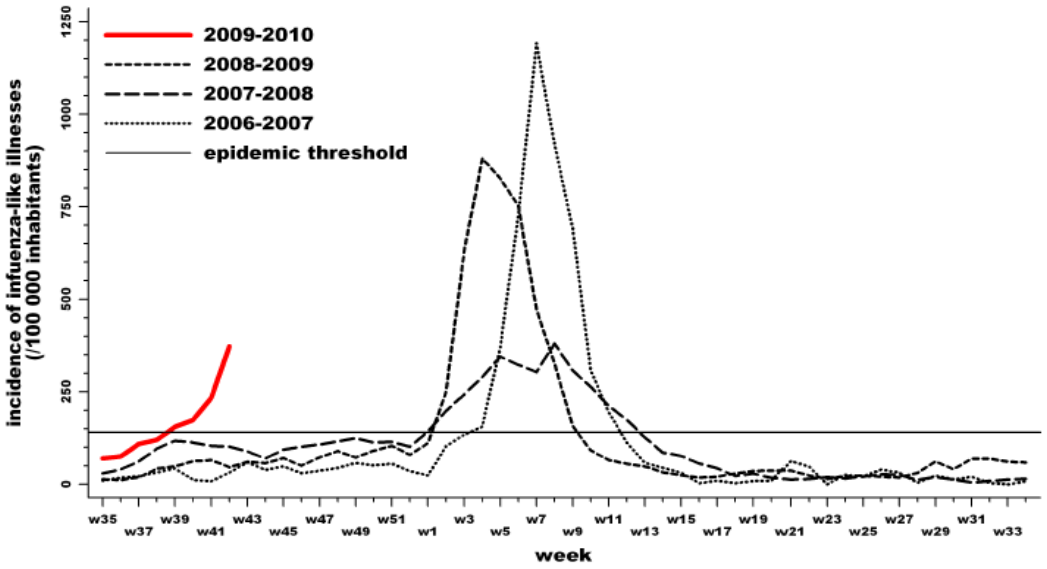


Figure 1: Evolution of ILI incidence (ISP/WIV, 2009 p.4)

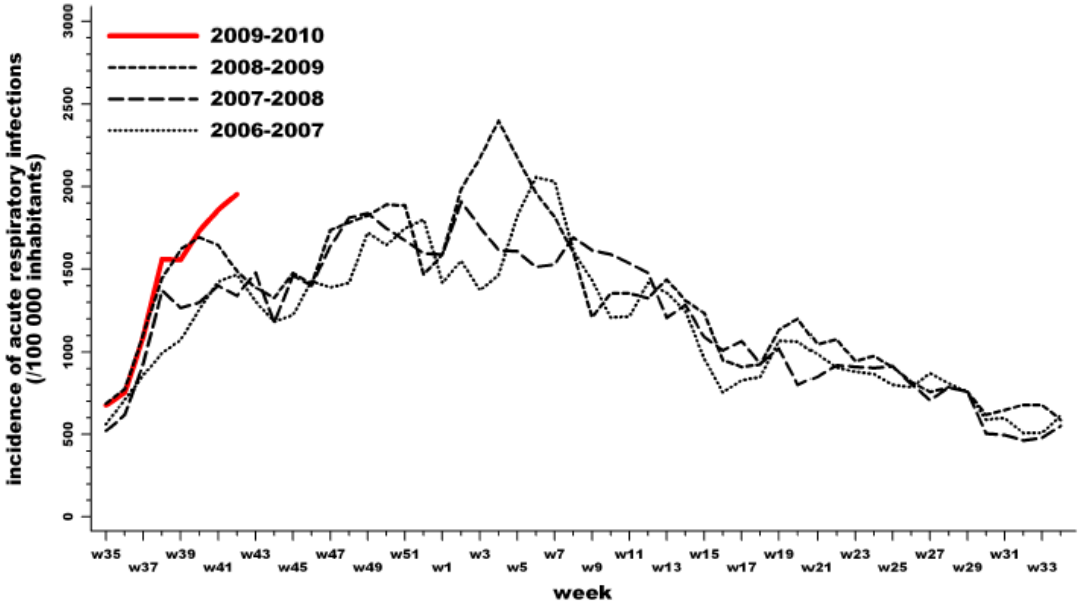


Figure 2: Evolution of IRA incidence (ISP/WIV, 2009 p.5)

The evolution of the Influenza like illnesses (ILI) indicates that the number of people infected with influenza like illness has exceeded the epidemic threshold since week 39 (last week of September 2009). Also amount of people with an Acute Respiratory Infection has never been as high in the past three years from week 41 (second week of October 2009) on. The Belgian Influenza Directorate base themselves on a solid methodology, developed by the Scientific

Institute for Public Health, that allows them to extrapolate the sample figures that they receive from the sentinel network of general practitioners. Although the epidemic threshold has only been exceeded since week 39, we have already perceived major 'ripple effects' on various levels and in various domains since the outbreak of the virus in the first semester of 2009. A newspaper article in 'De Standaard', that was published on 14th August 2009, summarizes the general economical trends that could be directly related to the Mexican flu (De Rijck, 2009). While the arousal and fear for the Mexican flue is spreading globally and probably at an equal pace, governments are replenishing their stocks of antiviral medicines and pharmaceutical organizations have commenced the race to be the first to develop and commercialize a vaccine. The major pharmaceutical companies, such as Roche and Glaxo Smith Kline (GSK), can hardly keep up with the production of these antiviral medicines, such as Tamiflu. Especially in the period after 11th June, when the WHO announced phase 6 of the pandemic alert, the figures of sale rose sharply (De Rijck, 2009). Although the national influenza director is very careful and proposes the relativity of the threat of the Mexican flu by comparing it with a regular seasonal flu, many industries and companies benefit from the general culture of arousal. The newspaper article closely examined some concrete facts and figures of some key pharmaceutical companies. The sale of Tamiflu, the antiviral medicine developed and commercialized by Roche, has tripled in the first semester of 2009 compared to the same period in 2008. Glaxo Smith Klein, the largest competitor, has sold 9 times more Relenza (similar anti viral medicine that has to be inhaled) in the same period. Besides the effect on the sale figures of the pharmaceutical industry, the Mexican flu has also induced effects in other sectors. According to an article in the Financial Times (Birchall, 2009), Kimberly-Clark, the major company that also manufactures Huggies (diapers) and Kleenex tissues announced an increase of their health division of 14%, from which half can be attributed to the sale of facial masks. Also 3M announced an increase in their sales figures. Companies, like Reckitt-Benckiser, that produce cleaning products and disinfectants like Clorox Dettol or Lysol also notice a strong increase in their sales figures (Birchall, 2009). Some of these companies explicitly promote their products as a means to 'fight' the H1N1 virus. Dettol has developed a website: www.swinefluheal.com, which provides information and news about the H1N1 virus. We have included a print screen of this website. The website provides general information about the H1N1 virus) and it integrates a H1N1 protection guide. Naturally, they also advise to use the appropriate cleaning products and disinfectants, products that can be provided by the company.

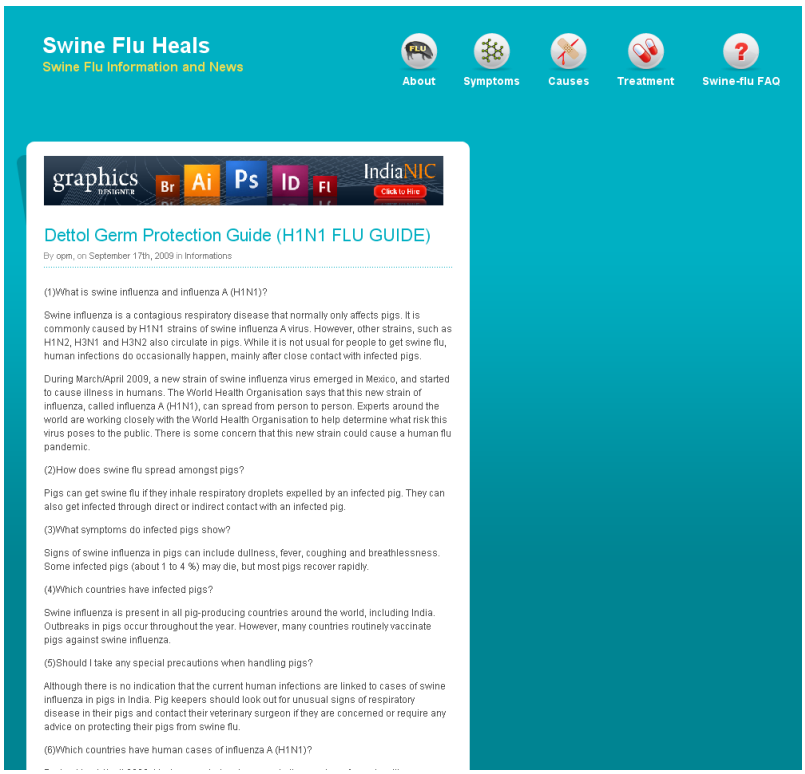


Figure 3: Print Screen of www.swinefluheal.com/informations/2009/09/17/dettol-germ-protection-guide-h1n1-flu-guide.html

(12)How can washing my hands help to protect me?

Washing your hands frequently can help to protect you from a wide range of infections.

Washing your hands frequently is the best way to protect yourself from a wide range of illnesses, including influenza. Everytime you touch something, germs can transfer to your hands. Touching your eyes, nose or mouth with unwashed hands could transfer the germs from your hands into your body. Washing your hands frequently, helps to remove the germs and stop them spreading to you and other people.

(13)How can I remove flu viruses from surfaces?

An infected person could spread germs to surfaces around them when they cough or sneeze, or touch them with unwashed hands or used tissues. Cleaning surfaces regularly can help to stop influenza viruses and other germs spreading around your home, to you and other people.

Cleaning surfaces with detergent and water can remove germs from an item provided you scrub all the surfaces and rinse them thoroughly with clean water. However, where proper rinsing is not possible (e.g. large or fixed surfaces such as kitchen worktops, toilet flushes and door handles) it is important to use a disinfectant to help kill the germs. It is particularly important to clean and disinfect surfaces that people often touch with their hands, such as;

handles and switches
taps and toilet flush handles
kitchen worktops
telephone receivers
computer keyboards.
Cleaning and disinfecting surfaces using products that destroy influenza viruses will give extra reassurance.

Figure 4: Print Screen of the protective guidelines on www.swinefluheal.com

We have found similar websites that explicitly focus on the H1N1 flu. One example is the commercial website www.tegenh1n1.be. The website offers various products 'to optimally protect oneself against the H1N1 virus'.

Figure 5: Print Screen of the website http://tegenh1n1.be

The pricelist of this company even mentions that "the offered products are promoted by Dr. Marc Van Ranst, virologist and inter ministerial director for the prevention of influenza in his campaign to prevent the Mexican flu".

Figure 6: Print Screen of a pricelist for products 'against h1n1', integrating expert endorsement

The sale of these products by the company is completely legal, as well as the marketing techniques that are used to promote the products (expert endorsement). However, there are also examples of illegal practices, abusing the credulity of many people. In the US, the U.S. Food and Drug Administration is enforcing the laws that protect consumers from illegal products marketed through the Internet that claim to diagnose, prevent, mitigate, treat or cure the 2009 H1N1 flu virus (FDA, 2009). They have already identified various examples of unapproved, uncleared, or unauthorized products:

- a shampoo that claimed to protect against the H1N1 flu virus;
- a dietary supplement that claimed to protect infants and young children from contracting the H1N1 flu virus;
- a "new" supplement that claimed to cure H1N1 flu infection within four to eight hours;
- a spray that claimed to leave a layer of ionic silver on one's hands that kills the virus;
- several tests that have not been approved to detect the H1N1 flu virus and
- an electronic instrument costing thousands of dollars that claimed to utilize 'photobiotic energy' and 'deeply penetrating mega-frequency life-force energy waves' to strengthen the immune system and prevent symptoms associated with H1N1 viral infection.

The flu has also become a very popular marketing tool. The next photo shows how a bottle of antibacterial gel accompanies a copy of a popular lifestyle and health magazine in Flanders (Vitaya, 2009). The cover mentions "Free disinfecting handgel. Do not give flu a chance".

Figure 7: The Vitatya magazine, including a free bottle of disinfecting gel

The key questions we ask ourselves are related to how the risk perceptions of people are constructed and what the implications of these perceptions are on their personal beliefs, attitudes, trust in governmental institutions, information seeking behaviour and preventive behaviour. The risk is amplified by various intermediary factors, such as media coverage.

How do people react to the vast amount of information about the 'risk' of the Mexican flu? How are their perceptions constructed and influenced? Some will be easily aroused and will show increased protective behaviours, some will be more critical, like the woman who responded to the newspaper article on the website of the newspaper:
(translated from Dutch in English):
"I am certainly not an adept of conspiracy theories, but I do think that, in the middle of one of the worst financial crises of the last decades, a similar global panic reaction is useful. I notice that I invest more in more expensive paper handkerchiefs with anti bacterial characteristics, in Dettol sprays and cleaning products etc. I also buy Knorr Vie (drink on the basis of vegetables) to make sure that me and my family get extra vitamins and every morning, we drink Actimel because it boosts the natural resistance of my body. I also consume more washing powder because everything gets washed more easily and toothbrushes are replaced more frequently. Am I afraid for the flu? Maybe I am, but Halleluja for my stock options in Unilever, Henkel, Merck etc."(Gwosdz, 2009)
The H1N1 virus was first labeled as 'Swine flu' but later renamed as 'Mexican flu' referring to its geographical origin. We could assume that the Swine flu label would have had its impact on e.g. the food industry. Belgium had to cope with several food-related crises in the last decade (e.g. BSE and dioxin crisis), crises that had a strong impact on the consumption of e.g. meat and eggs. Since travelers were insured, the cost of annulations of trips to Mexico was probably lower than the potential cost of the ripple effect of a 'Swine flu' on the food industry. However, we cannot provide empirical data for this statement. Anyway, we see that the H1N1 label is used in combination with the more popularized 'Mexican flu' label. This is a nice example of the reconciliation between the scientific positivism approach and the public oriented approach, taking into account the 'lay' perspective on the risk issue.

We have used the example of the H1N1 virus to introduce the readers to the importance of risk perception and to briefly illustrate the social and media amplification of risks and the accompanied ripple effects on e.g. the economy. Communicating about risks is very complex since it requires in a way risk perception management as well. We consider risk communication research very relevant and contemporary as our present and future society will always be confronted with risks of various natures.

Key objectives and structure of the dissertation

A dissertation in communication sciences has to be profoundly supported by theoretical frameworks as the research objects, involving human interaction and communication, are very often quite abstract and difficult to measure with exact and reliable measurement tools. That is why the key objective of the first part, the theoretical body, is to provide the reader with an extensive and in-depth literature review. The literature review will try to reconcile various theoretical frameworks on the three core levels of analysis that have to be related to risk communication research: the individual level (psychological frameworks), the interpersonal level (socio-psychological frameworks) and the (meta) social level (sociological

frameworks). The theoretical body will cover four large chapters. In the first chapter, we will try to define the scope of our research topic and to provide a clear definition of 'risk' and the 'new risk society'. We will use Beck's perspectives on the new risk society as one of the theoretical cornerstones that underlie our approach to the key concept of 'risk'. One of the other key frameworks that will be extensively discussed is the Social Amplification of Risk Framework. Both the concept of the new risk society as the SARF will be illustrated by means the concrete case of terrorism as a 'new risk'. The second chapter will confront and reconcile both theoretical frameworks as more practically inspired and applied models about risk communication and risk management. It will also point out the overlaps and differences between crisis and risk communication, as our perspectives on risk communication should be clearly defined. We will close the chapter by discussing some key barriers for effective risk communication and offering some concrete best practices to cope with these problems. As trust, credibility and stakeholder participation in risk communication are three of the main ingredients to construe effective and efficient risk communication strategies, our third chapter will discuss these key issues more thoroughly on various levels of analysis. These issues will also be considered especially in the light of governmental risk communication as this is also one of the main research topics of this dissertation. The three first chapters will include elements and ideas that support and advocate a public oriented risk communication policy. The plea for public oriented risk communication policies will be supported by means of the frameworks that will be discussed in chapter four. The fourth chapter is the most extensive one. It will provide arguments that sustain the idea that risk communication is a multidisciplinary and multilevel process. As we will scrutinize the concept of risk from the viewpoint of a communication scientist, we will have to integrate a broad palette of theoretical approaches with psychological, social psychological and sociological roots. We will also have to pay special attention to the concept of opinion leadership in general and more specifically in the context of risk communication as this concept will be one of the key research topics in our empirical body. Eventually, in our theoretical body, we will try to come to a more holistic approach that combines elements of the three levels of analysis. The final aim of the theoretical body is to provide a clear and solid foundation for the empirical studies that will try to scrutinize the core concepts that were presented and discussed in the theoretical body. Our empirical body will exist of two parts: a public oriented part and a message oriented part. The public oriented research will include three research reports, covering six empirical studies. The empirical studies are quantitative research studies. The key research objective is to create and validate a methodology that can offer us a solid measurement tool to perform a reliable audit of risk perception levels and all the concepts that are related (mental distance, risk information behaviour, protective behaviour, trust in the government as a risk regulator and risk communicator etc.) and it will allow us to identify crucial elements for improvement. Moreover, the methodology should be applicable in most risk contexts, that is why we opted to validate our methodology in three risk contexts: terrorism, the bird flu (or H5N1 virus) and the financial and economical crisis. We will also validate an information seeker's segmentation tool. This tool will allow us to identify and profile our key communication target groups for our risk communication strategies

(especially the opinion leaders will play the leading part in this perspective). The final objective of this empirical part is to scrutinize the multivariate relationships between the key concepts and to confirm the relationship between risk communication and risk regulation by means of concrete and statistically significant results that were retrieved in all three risk contexts. The second part of the empirical body will include two experiments that scrutinize the relationship between message specificities and credibility.

PART ONE

THEORETICAL BODY

CHAPTER ONE

THE NEW RISK SOCIETY

1. Introduction: defining the core concept of risk

Before elaborating on the abstract levels of the risk concept and discussing the traits of the 'new' risk society, we will provide an introduction to the core concept of risk.
As Penning-Rowsell and Handmer state, the definition of risk is very complex. They devided the definitions of risk into three categories (Handmer & Penning-Rowsell, 1990 p.6):

- Risk as a statistical concept, so exclusively related to the occurrence probability of the damaging effects;
- Risk as the product of the event probability and the severity of the impact, by which they refer to the classical and most used definition of risk;
- Risk placed in a context in which the emphasis is put on the distribution of power and control, resulting in a distribution of costs and benefits.

Wiegman and Gutteling stated that environmental hazards can be assessed both objectively and subjectively. We consider this dual mode of assessment to be applicable on all types of risks. Objective assessment of risks involves mostly quantitative risk analyses, integrating probability numbers and in most cases also a numerical and scientific expression of the potential consequences. Subjective risk assessment is at least as complex as the objective assessment, integrating processes and viewpoints from various disciplines. Subjective risks are perceived, estimated or rated by 'the public' (Wiegman & Gutteling, 1995 p.227). As we will discuss further on, 'the public' in the research domain of risk communication is a very broad label that is used to summarize the whole of various stakeholders that are involved in the risk management process. We consider the public to consist of individuals or groups of people who can be considered to vary from active and highly involved to rather passive and not involved with specific risk contexts. We include the passive or low involved subgroups as they can also be considered to be exposed to the risks as such or the communication about risks. Risk communication is often omnipresent and unavoidable, certainly when the risk contains high news value and induces large media coverage. Risks can be attenuated or amplified and may infiltrate in the personally constructed risk realities of people that are not even directly confronted with the risks or their consequences. We will discuss the amplification and attenuation processes of risks further in this chapter (6).
This doctoral dissertation will combine elements of risk management studies from the scope of the social scientist, combining concepts and ideas from psychological, socio – psychological and sociological theories and frameworks. We can state that we will mainly use risk as a concept in the context of the third category of definitions, as defined by Handmer and Penning-Rowsell (1990). We have the impression that the distribution of power and control has mostly been formulated from the viewpoint that the one who

controls the probability information and the power to control the risk as such has the power, introducing the key question: 'who bears and who imposes the risk?'. Beck already indicated that, since the 1970's, the 'wealth distributing society' is accompanied by a 'risk distributing society' (Beck, 1992). We will discuss the new risk society perspective of Beck in section 3. Our studies will mainly focus on the 'new' and untransparent risks or as Ulrich Beck formulates it the modernization risks, but we will put strong emphasis on the 'risk bearer', the individual that is confronted with risk information (probability, impact, etc.). The risk bearer does not necessarily have to be the passive element in the power distribution process, especially in the context of risks that are mainly socially and medially constructed. As we will discuss in section 6, risks can be socially and medially amplified or attenuated by various processes on a multiple levels (individual, communal,etc.). Behavioural intentions and concrete behaviour of individuals as elements of a society is driven by their individual and social perceptions of the risks. Eventually, the impact on the society on an economical, political and social level is the outcome of the combinations the processes that underlie the process of risk perception. So in a way, we can state that the power can be transferred partly or even completely to the risk bearers. We will try to provide valid theoretical and empirical evidence to corroborate our statement that it is vital to scrutinize, indentify and even actively involve the 'public' in risk communication and risk management processes.

2. A taxonomy for disasters and risks

Wilkins and Patterson have proposed a taxonomy that includes three types of disasters and risks: transparent, translucent and opaque risks. The following overview provides more information about the nature and specificities that are associated with the types of risks (Wilkins & Patterson, 1990 p.87).

	Transparent risks	Translucent risks	Opaque risks
SCIENCE			
Familiar scenario	Yes	Usually	Rarely
Familiar cause	Yes	Sometimes	Rarely
Triggered by	Random natural forces	Unknown forces/human error	Interactive processes
Risk quantifiable	Yes	Yes	Rough estimates
NEWS			
Major new question	What, where?	Why	How
Interpretable	Yes	Rarely	No
Fundamental attribution error	Present and appropriate	Present but requires added analysis	Inappropriately dominates new stories
POLITICS			
Solution proposed	Reconstruction	Regulations	Prohibitions or regulations
Role of politics	Prepare	Mitigate	Obfuscate/mobilize
Role if individual vs role of state	Individual action effective: state supports	Individual ineffective without state	Transnational action necessary
Central political question	How affective is government	How expensive is safe	How fair is safe

Table 1: A taxonomy for disasters and risks (Wilkins & Patterson, 1990 p.87)

The 'opaque' risks are most interesting in our point of view. Opaque risks or disasters are neither familiar nor observable. They are mostly low probability events. Reports and media attention concerning such disasters and risks is strongly characterized by the fundamental error of attribution. It is a theory describing cognitive tendency to predominantly over-value dispositional explanations (i.e., attributions or interpretations) for the observed behaviours of others, thus under-valuing or failing to acknowledge the potentiality of situational attributions or situational explanations for the behavioural motives of others (L. Ross, 1977). The error especially arises when risk situations are 'new', so the analysis does not comprise the entire system and the language that is used to express potential risks is not precise (Wilkins & Patterson, 1990 p.84). Wilkins has also proposed some suggestions to improve media risk communication about opaque risks and disasters:

"Since public understanding of obviously complex issues is both simplistic and contradictory, reports about opaque risks should be couched not in numerical statements but in a cultural and political context which frames hazard impact in terms of the structural inequities in society" (Wilkins & Patterson, 1990 p.92).

Grounding ourselves on the classification of Wilkins and Patterson, we can state that opaque risks are largely defined by their political and social connotations. We find very strong similarities in the specific traits of opaque risks with the 'new risks' as defined by Ulrich Beck

in his new risk society perspective. We will now discuss the vision of Beck on the new risk society and his definition of 'new' risks (Beck, 1986, 1992).

3. The new risk society

The German sociologist Ulrich Beck is considered as one of the most prominent contemporary scholars who focus on the societal issues that are related to the modern risk society (Beck, Schwartz, Hajer, & van der Aart, 1997). Throughout his works, Beck takes into account all facets of the society and describes how risks increasingly infiltrate our daily lives. In one of his first books, 'Risikogesellschaft. Auf dem Weg in eine andere Moderne' (1986) he introduced the concept of alteration of the industrial or first modernity to a second, new modernity: the risk society (Beck, 1986). In this new risk society, mankind is encountered with several new and self-made destructive risks. His new macro sociological view on the world was globally spread by the translated copy 'Risk Society: Towards a new modernity' (Beck, 1992).

Beck describes two societal transitions. A first transition resulted in the industrial society and was characterized by the scarcity of goods, resulting in a general focus on the distribution of goods. However, because of the rapid innovation processes and the establishment of the welfare state in western societies, a 'wealth distributing society' was established. Inevitable, this wealth distributing society is accompanied by a 'risk distributing society', which integrates the rise of new risks such as global heating, aids, BSE, and terrorism. As Beck states, it is very hard to control some of these new risks nationally as they are the result of global processes. So the risk control processes demand international collaboration between governments, industrial groups, cultural and social groups, and other potential stakeholders.

The dynamism of the modern, industrial society leads to a strong de – traditionalization of the roots and structures of the industrial society. We must come to a redefinition of some classical concepts such as family, social classes, corporations, and the whole of techno-economical evolutions. Together with these strong redefinitions and changes, Beck introduces the concept of self-destruction that hypothetically could accompany these radical changes. So the outcome of the industrial revolution might result in the self-destruction of the society that results from this (r)evolution. With this hypothesis, the idea of a reflexive modernity enters the play. Beck puts emphasis on the fact that the successes (and not the failures) of capitalism are the causes of the destabilization of the industrial society's fundamental bricks (Beck, 1992 p.153; Beck, 1994 p.1-13; 1999 p.79-81). The transition to the reflexive modernity is accompanied with the development of a 'new' risk society. The industrial society produced risks and threats, but they were not integrated on the political or public agenda. These self produced, 'residual' risks had latent side effects that were legitimized within the concept of the ideal of economical and societal prosperity. So this residual risk society tolerates the new, self produced risks and threats. The rapid and dynamic processes have lead to the fact that many of these risks and threats have taken serious proportions and as these risks are characterized by their global, uncontrollable, untransparant nature. However, they are gradually incorporated in the social, medial and

political agendas. The public, political and private discourse is dominated by the debates and conflicts about these new risks. What used to be functional and rational, is now a threat to our lives. The concept of 'reflexivity' expresses this process in a very accurate way. According to Beck, public and political institutions have to be reflexive in terms of confronting themselves and criticize themselves in order to solve the problems and the consequences of the risk society. The new risks cannot be solved according to the traditional industrial methods. Self reflection and self criticism bring along the consciousness, capabilities and knowledge that might decrease the automated risk production and introduce the societal self transformation. Beck points out the difference between the concept of "reflection" (according to Giddens and Lash this is the knowledge about the fundamental issues, the problems and consequences of the modernization process) and reflexivity. With reflexivity, Beck refers to the self confrontation and self reflexivity about the unknown consequences and about the impossibility of knowing these consequences and their solutions. Beck states that reflexive modernization succeeds modernity, but he dissociates himself from the concept of a post-modernity as suggested by Lyotard and Baudrillard (Fredriksson, 2009).

"Beck, in line with Giddens, does not describe modernity's transformation as a start that contrasts with an end, but rather as a transformation where the qualities of an epoch are rationalized by its own processes"(Fredriksson, 2009 p.23).

The idea that people in late modernity are subject to dominant and omnipresent uncertainties and risks and that modernity no longer simply brings along human progress is also advocated by Anthony Giddens (Giddens, 1991, 1997). The fact that people in late modernity have gained more knowledge about risks as well also leads to much more perceived uncertainties. People subsequently turn to alternative expertise and knowledge claims. As Lupton and Tulloch state:

"Both theorists agree, therefore, that `risk' is closely linked to reflexivity, accountability and responsibility. Risk is thus a central feature of a society that has come to reflect upon itself, to critique itself."(Lupton & Tulloch, 2001).

Fredriksson states that the concept of reflexive modernization does not include a replacement, it is rather a radicalization of modernity and its principal formations (structures, actions, conceptualizations). He also adds two aspects that could be considered as being even more vital: the self-confrontation of modernity's self-produced and manufactured risks and the deinstitutionalization of political practice taking form as subpolitics (Fredriksson, 2009 p.23).

As mentioned before, public, social and political institutions will need to cooperate on a global level. The nature of the new risks creates a communal sense of fear. Beck pones that these feelings of fear can be used to unite people. Surely fear can provoke solidarity, but the question raises how cohesive and powerful this fear induced solidarity society could be. Beck uses the 9/11 attacks as an example of this process. The attacks induced international cooperation and unity and fear has had a unifying power (Beck, 2002). Feelings of uncertainty and fear may unite people within a certain community, however, we do advocate the need to refine the general premise of Beck which states that all new risks create communal senses of fear. To conclude this section, we want to draw parallels

between the opaque risks, as defined previously by Wilkins and Patterson (1990) and the 'new risks', as defined by Ulrich Beck. Both concepts integrate various traits that are specific for these new types of risks: untransparency and uncontrollability of the cause and scenario, the risk probabilities are hard to estimate and not quantifiable, they are triggered by interactive processes and very often, transnational cooperation and action is necessary to construct and implement solutions to counter the risks.

4. New risks within the transitional processes

Increasingly more, the concept of 'new risks' or 'new societal risks' are used to describe the challenges facing contemporary society. New risks are distinguished from the 'old' risks of the industrial society that could be tackled by strategies that were developed and successfully implemented by authorities and industries in the industrial epoch. The new risks are being introduced in the contemporary society on various levels.

On the **economical** level, we could use the example of exploitation of the risk concept in a commercial sense through the creation of new markets. Beck mentions the example that various solutions for new risks are being proposed and commercialized, but the causes of the risks are not tackled. He uses the example of air purifying systems that are promoted and sold on a large scale while the causes of pollution are not treated. When we take a look at risks that are mainly socially and medially constructed, we could give the example of the coca cola hoaxes, set up to destabilize the trust in the brand and affect the image of the company. On the **political** level, various (new) political actions are legitimized, judicial initiatives (exceptions on the privacy laws) are approved etc. to cope with the new risks. Even with no conclusive evidence of risk, as often is the case with the new risks, governments consider themselves entitled to use and install precautionary measures (Beck, 1998; O'Malley, 2004) On a **medial** level, the media as a fourth power will play a very important role in the life cycle of a 'new' risk. Especially in the introduction phase, the media can have an important agenda setting role. The media may also amplify or attenuate risks and cause strong ripple effects on various levels: from the individual level to the entire society, from effects on economical levels to political levels. We will discuss these mechanisms in section 6.

The transitional processes take place on two key levels: the economical (Beck, 1999) and the political level (Beck, 1994, 1998). The **economical transition** includes that, together with the evolution of risks and risk societies, there is a shift from 'relations of production', as defined by Marx to 'relations of definitions'. These relations are defined by the harmfulness, the knowledge about the causes, actors and dimensions of the risk. These definition relations decide upon data, knowledge, evidence and compensations. The question that arises is whether it is the actual knowledge that allocates power to the involved parties or whether it is the perceived risk regulating potential of the stakeholder. **Political transition** includes that the transformation of the political constructions can be defined in a two way direction. Contemporary politics expand to decentralized systems of bottom-up subpolitics. Increasingly more institutions such as unions, the academic world, social movements, etc.

claim their democratic rights and participate in the constitution of the society. So bottom-up or cross participation of either individuals or groups is becoming more and more apparent. Next to this bottom-up input, Beck also confirms the transition of the global risk politics. The result is a gradual implementation of an institutionalized cosmopolitanism, which exists of the UN, NATO, civil networks, international cooperatives and other international organizations. This cosmopolitanism leads to a post-international political climate: global subpolitics. Beck's concept of subpolitics describes the transformation and expansion of general politics in a reflexive modernity. Subpolitics is also about the structure of living conditions and concerns the traditional structures of a society. Supplementary to institutionalized politics, where the focus is on legislation, regulation, legitimization and administration (Fredriksson, 2009). One of the problems that arises in the political sphere is that in reflexive modernity, the cornerstones for political legitimacy are unstable and questioned as the new risks of the reflexive modernity, created by modernity as a process, become apparent:

"It is to a high degree a question of responsibility in a situation where the systems of institutional politics and the welfare state can't offer the security searched for" (Fredriksson, 2009 p.25).

This might be an explanation for the decrease in general trust and confidence in governments as legitimate risk regulators en especially in governments as legitimate risk communicators as they are not perceived as knowledgeable about the 'new' risks. We will discuss the concepts of trust, confidence and credibility in chapter three.

Beck also explicitly relates the risk society to *"(…) a science, media and information society"*(Beck, 1992 p.46). In the post-industrial risk society, knowledge has become the key product that is traded. Information is becoming increasingly important in a social, economical and political context. The creation and classification of knowledge is primarily in the hands of science and research. Information dissemination is assumed to be one of the primary roles of the media, however increasingly more political players realize that knowledge and information flow control is very important. This especially accounts for the new risks as the knowledge about the modern and untransparant risks is a powerful tool to control the perceptions that come along with this uncontrollability. This results in what we could call a delicate struggle for information acquisition and control between the three main players: scientists, media and political agents. Beck allocates a great deal of this power to the media (Beck, 1990).

The main critiques on Beck include issues concerning the lack of empirical foundations for his conclusions about the detraditionalization of the key structures of the modern society.

"(…) while the notion of the risk society is a potentially useful and interesting one, much of the debate over the extent to which it adequately describes the ontology of contemporary life has taken place at the level of what Beck *calls 'bold theories' rather than being explored empirically*"(Lupton & Tulloch, 2001).

According to Lupton and Tulloch, people are still shaped by family, work and other traditional structures of modernity. Besides, the risks of the new 'risk' society are less present than expected (Lupton & Tulloch, 2001 p.1; 2002). We agree with the critique that

Beck's theoretical viewpoints do not have strong empirical roots. Nevertheless, his sociological perspective on the 'new' risk society is very valuable and has created new looking glasses that can be used to scrutinize risk perceptions on all levels of analysis: cognitive, socio-psychological and sociological. We cannot accept the statement that new risks are less present than expected. Firstly, we have doubts about the empirical foundations of this claim. The authors do not mention any methodologies used to identify risks or classify them into 'traditional' versus 'new' risks, related to the new risk society. Secondly, new risks are not always directly observable with the current methodologies for risk identification and risk analysis, often created for traditional risk assessment and management by scientists and risk experts. Tools to integrate risk perceptions, that may identify the 'new risks' that are socially and medially constructed, are rarely available nor are they used in risk management strategies. That is why we will strongly support the development of risk management strategies that use stakeholder participation methods and interactive two-way risk communication throughout the entire risk assessment and risk management process.

Lupton and Tulloch continue by stating that very little theoretical and empirical research has been established about the ways in which notions, narratives and knowledge about risks, and certainly the 'new' risks are developed, understood and embedded in the social environments of people or *"the different meanings it has for those using the term 'risk'"* (Lupton & Tulloch, 2001 p.1). We do think that there are many disciplines that scrutinize these issues, but they are all fragmented over several academic disciplines. We should come to a holistic approach, integrating cognitive perspectives on risk information processing and heuristics for risk perceptions, risk information seeking and information sufficiency, socio psychological perspectives about how the risk perceptions are not only constructed individually, but also socially. One of the primary aims of this PhD is to set up a new methodology, inspired by the combination and clash of the perspectives of these theories and confronting them with Beck's perspectives on the 'new' risk society. The subjoined table integrates the most important theories and perspectives that will be integrated in the theoretical body of this dissertation.

The empirical body will develop and validate a methodology that incorporates the general concepts that are originated from these key perspectives. The methodology will be validated in three different risk contexts: terrorism, avian flu and the financial economical crisis. We perceive terrorism and the financial and economical crisis as modernity risks that are rather untransparent and related to the modern society.

Discipline / theory	Examples of theories and authors
Heuristics for risk perceptions	(Lee Ross & Nisbett, 1980; Tversky & Kahneman, 1973, 1974)
Experiential risk perception	(Sloman, 1996; Paul Slovic, Melissa L. Finucane, Ellen Peters, & Donald G. MacGregor, 2004)
Heuristic systematic information processing model	(Chaiken, 1980; Eagly & Chaiken, 1993)
Information behaviour Risk information behaviour Risk information seeking Risk information needs 'New' risk information needs	(C. Wilson, 1990) (Baker, 1996; Turner, Rimal, Morrison, & Kim, 2006) (E. Ter Huurne & Gutteling, 2008) (Albrecht, 1988; Driskill & Goldstein, 1986; Lion, Meertens, & Bot, 2002)
Social network contagion theory of risk perception	(Scherer & Cho, 2003)

Table 2: Multidisciplinary character of the dissertation. Integrated theories and perspectives

A last critique on Beck's perspective may be that *"the properties of risks haven't changed as dramatically as Beck suggests"* (Fredriksson, 2009 p.27). While pre-industrial and industrial societies were confronted with the plague or syphilis, our 'modern' society has both threats that are assumed to be partly or completely due to industrialization, like BSE or the bird flu or even by 'accidents' like the AIDS virus. We do not entirely agree as the examples that are offered have deep roots in the industrialization process, but there are many other examples of risks that are less transparent or tangible and that are mainly socially or medially constructed such as terrorism. Also risks that are, in our opinion, less impactful or harmful are amplified by the media, governments and even the industries that benefits from these risks such as the H1N1 virus also called the Mexican flu or the swine flu. The Belgian government wisely suggested not to use the label swine flu since Belgium already had to deal with the negative connotations of the BSE crisis in 1996 and the dioxin crisis in 1999. These crises affected the consumption of certain products (meat, eggs, milk etc.) so by labeling the new influenza virus as the 'swine flu', even though there was no direct link with the consumption of pork, the related industries could be affected.

Naturally, Beck's work has to be read critically, but the added value of the paradigm as a perspective rather than as an empirical analysis is not to be underestimated. We conclude with the words of Fredriksson: *"From this reading we can get relevant insights not offered by other theorists into the everyday life of individuals and the functioning of institution"* (Fredriksson, 2009 p.27).

4.1. New risks: uncertain odds and consequences

If we use Beck's viewpoint on the raise of the new, industrial or so called 'manufactured' risks, we can characterize these risks as follows:

	Pre-industrial risks	Industrial risks	Modernity risks
Cause	Natural	Natural and industrial	Natural because of industrial impact, manmade risks
Proximity	Personal	Personal environment	Global
Coverage	Individual	Hierarchical	Democratic
Confrontation ratio	Calculable	Calculable	Incalculable
Consequences	Limited damage	Regional destructiveness but consequences on larger scale	Unlimited, longer term, larger scale
Perceived control	High, control is in the hands of experts, scientists	Medium, control is in the hands of experts but information provision is necessary	Low in case of lack of knowledge
Information flow	No flow, limited top-down	Top-down info flow	Two way interactive information flow
Risk perception	Individually constructed	Individually constructed	Individually, socially and medially constructed
Risk perception	Depends on risk itself	Depends on knowledge of risk causers	Depends on knowledge of complex information exchange processes
Nature of risk policy and risk communication	Dominance, no consultation, no participation	Hidden dominance: information provision, limited consultation but no participation	Stakeholder consultation and participation

Table 3: Comparison pre-industrial, industrial and modernity risks

For modernity risks, we make the distinction between first order modernity risks as the direct results of the industrialization processes and second order modernity risks as indirect consequences of the industrialization processes.

First order risks Direct consequence of industrialization Global warming, nuclear threat, BSE, AIDS etc.	Second order risks Indirect consequence of industrialization Terrorism (biological, nuclear, etc.)
Mainly unintentional	Intentional
Unintentional targets	Intentional targets
Mainly tangible consequences: measurable, rather predictable	Intangible aims: terrorizing minds, unpredictable effect of ripple
Untangible risks	Untangible risks

Table 4: Comparison first order and second order risks

4.2. The second enlightenment

Beck states that all political, public or private stakeholders should become conscious of the actions and consequences of the new risk society and its characterizing issues. They should realize that it is impossible to control these risks, as they are untransparant and unpredictable (even scientifically). He also pones that we should strive to an establishment of open minded governments, corporations with a social conscience and better informed civilians (Beck, 1999 p.108). The democratic processes that are initiated by these transitions could ideally lead to a global democratic change and as Beck and Willms mention: a second enlightenment that could be labelled as an ecological enlightenment that accompanies the second societal transition (Beck.U., Willms, & Pollak, 2004). The concept of second enlightenment is extremely important for academics as this could provide an answer to many questions of the new time. The first enlightenment emphasized the power of the mind. This revolution lead to the establishment of a culture of rights and contradictory, of individualism. We need a new transition to a culture of consciousness. The contemporary society is characterized by risks, the threat of individual, ecological and societal destructive processes. That is why we need to create a communal consciousness. The first enlightenment brought to us the power of reason and thought us how to use our rational capabilities. Now it is time to dig into the deep and create a deeper level of consciousness: the collective consciousness. The industrial transition has lead to secularization and liberation from the doctrines of church etc. But it has also lead to individualism and consumerism. As Beck states, not only goods can be sold, but also thoughts and intangible items such as risks. The individualism and consumerism results in a climate of egocentrism. Also the electronic social networking tools (internet, spaces etc.) stimulate this climate of ‘together alone’.

4.3. Neoliberal governmentality in the risk society

The paradigm of neoliberal governmentality was constructed by several authors (Dean, 1999; O'Malley, 2004). Deborah Lupton summarizes this paradigm in her contribution in Mythen and Walklates 'Beyond the Risk Society' (2006) in a very applied language (Lupton, 2006). She points out that for the 'good citizen', risk avoidance has become a moral enterprise relating to issues of self-control, self-knowledge and self-improvement. A lot of the authors use Foucault's conceptualization of moderns of modern power to construct the idea of governmentality through the sum of the self-governing and self-assessing capacities of citizens (Burchell, 1991). New governmentality is characterized by a set of diverse tactics and strategies: *"governmentality gains its meaning and purpose from no single source, no unified sovereign subject. Rather, the tactics characteristic of governmentality operate diffusely, to dispose and order populations, and to produce and reproduce subjects, and their beliefs"* (Butler, 2004 p.52). By passing responsibility and rendering perceived control into the hand of civilians, governments are trying to induce perceived readiness and preparedness and to create a false feeling of control and power over the risk.

5. A systematic classification of risk perspectives

As Ortwin Renn states, *"classification defines the conceptual tools necessary to select and order the phenomena a researcher attempts to study"* (Renn, 1992b p.55). There are various classification of risk research: classifications based on hazard types (Hohenemser, Kates, & Slovic, 1983), on the definition of the risk concept (Fischhoff, Watson, & Hope, 1984; Vlek & Stallen, 1980), or on risk characteristics (Slovic, 1987; Slovic, Fischoff, & Lichtenstein, 1981; Starr, 1969). Renn mentions that a classification should not be limited to one denominator, but it should be capable of offering a framework for comparison and analysis of all possible risk concepts. Eventually, communalities and distinctions between various risk concepts can be determined. Based on his previous work, Renn defines seven approaches to risk conception and assessment (Renn, 1992a p.56):

- the actuarial approach (using statistical predictions)
- the toxicological and epidemiological approach (including eco-toxicology)
- the engineering approach (including probabilistic risk assessment or PRA)
- the economic approach (including risk-benefit comparisons)
- the psychological approach (including psychometric analysis)
- social theories of risk
- cultural theory of risk (using grid-group analysis)

The approaches vary in the underlying base (research) unit (operational definition), their methodological choices, the complexity of risk measures, and the instrumental and social function of the risk perspective. We could summarize the first four approaches as the objective risk estimates approaches, as discussed previously and referring to Wiegman and

Gutteling (1995). The last three approaches could be classified as subjective approaches. Renn integrated the seven approaches into one schematic representation.

The approach of this dissertation is a combination of the psychological perspective with social theories of risk and the cultural theory of risk. From the psychological approach, we will use psychometric perspectives (Chaiken, 1980; Slovic et al., 1981; Tversky & Kahneman, 1974), combined with other cognitive theories that explain risk information behaviour, risk information seeking and information needs (Krikelas, 1983; C. C. Kuhlthau, 1991; T. D. Wilson, 1997; T.D. Wilson, 2000) and the concept of self-efficacy (Wiegman & Gutteling, 1995). For both our theoretical foundations as for our empirical body, our base units include both elements of subjectively expected utility (psychology) as shared values (cultural theory). Our predominant methods combine psychometrics (psychology) and survey analyses (social theory). The scope of our risk concept includes individual perceptions (psychology) as social interests (social theory), as cultural clusters (cultural theory) on an aggregated level (clustering analysis). Our basic problem areas include areas of social relevance (psychology) and the empirical validity of our methodology and segmentation (cultural theory). Our major application area primarily involves constructing solid and effective risk communication strategies but also policy making and regulation (stakeholder participation in risk decision processes). The instrumental function of our approach mainly involves individual assessment but also touches political acceptance issues and even cultural theory issues. Our main goal is to unveil the risk perception mechanisms for potential risk reduction (perceived risk reduction) and to offer solutions how to cope with uncertainty by communication about (new) risks more effectively. The latter can be achieved by integrating the two main cornerstones that will be the outcome of our studies: public oriented, two way interactive risk communication and stakeholder participation in risk decision processes.

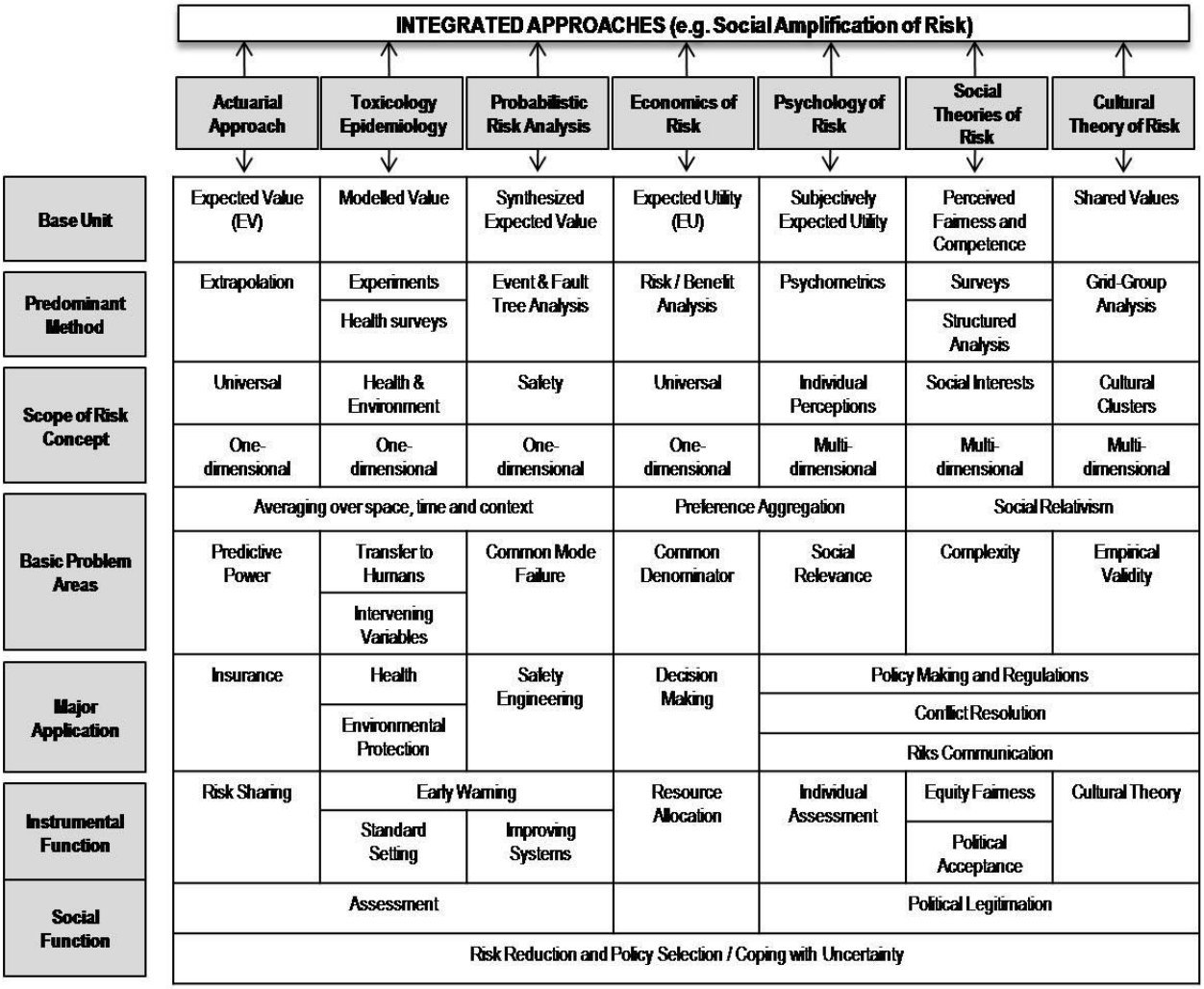


Figure 8: A systematic classification of risk perspectives (Renn, 1992b p.55)

Renn also mentions a vital theory that integrates various elements of the seven approaches that are summarized in the table: the social amplification and attenuation or risks perspective, as developed by Kasperson et al. (R. E. Kasperson et al., 1988).

6. Social amplification en attenuation of risks

The theoretical foundations of the social amplification and attenuation of risk theory (SARF) are developed in five main publications (Burns et al., 1993; R. E. Kasperson, 1992; R. E. Kasperson & Kasperson, 1996; R. E. Kasperson et al., 1988; Renn, 1991). Kasperson and Kasperson analyze the phenomenon of social amplification and attenuation of risk from a sociological point of view (R. E. Kasperson & Kasperson, 1996), but they do emphasize the multidisciplinary nature of their framework. Jeanne Kasperson, Roger Kasperson, Pidgeon and Slovic mention the motive for the development of the framework themselves as follows: *"The idea arose out of an attempt to overcome the fragmented nature of risk perception and risk communication research by developing an integrative theoretical framework capable of accounting for findings from a wide range of studies, including: from media research, from*

the psychometric and cultural schools of risk perception research, and form studies of organizational responses to risk."(J. X. Kasperson, Kasperson, Pidgeon, & Slovic, 2003 p.13).
As we can conclude from this statement, their primary motivation is to create an integrative framework that reconciles various perspectives and approaches from diverse disciplines, as the study of risk perception and risk communication requires a similar approach. In the previous section we have also emphasized the multidisciplinary and multi methodological approach of this dissertation. The social amplification of risk framework reflects our holistic approach to risk perception and risk communication. Especially in the light of the opaque risks, that are mostly socially and medially constructed and amplified or attenuated, the framework offers a potential theoretical ground.
The authors (Burns et al., 1993; R. E. Kasperson, 1992; R. E. Kasperson & Kasperson, 1996; R. E. Kasperson et al., 1988; Renn, 1991) stress the interdependency of physical attributes and the social dimension of risk as a complex phenomenon. The framework focuses mainly on the dynamic cognitive and social processes that underlie the perceptions of risks and the responses to these risks in terms of concrete individual behaviour (micro level), social responses (meso level) and effects or impacts on the entire community (macro level) and the structures that make part of it such as the economy, political structures, communal cohesion etc. In particular, as Kasperson et al. mention, the SARF will prosper in processes by which certain risk situations and uncertainties that are objectively judged as rather harmless by experts, because of their low impact consequences, small-scaled impacts, low probability levels etc., but that have gained unreasonably much attention and can become a particular focus of concern and socio-political activity within a society. On the other end of the continuum are the risks that are objectively and scientifically labelled as potentially harmful, but that receive comparatively less attention from the society. This is called risk attenuation (J. X. Kasperson et al., 2003). The first thing we want to add to this is that we assume that some risks cannot be objectively estimated anymore, so the process of defining harmful and harmless risks should be reviewed. We think that risks should always be assessed based on the perceptions that they evoke and the estimation of the potential consequences of these individual and communal risk perceptions. Naturally, this should be combined with the traditional risk assessment and analyses that are available and still offer a grounded base for prediction in many cases. As Kasperson et al. mention themselves:
"What is amplified or attenuated are both the signals to society about the seriousness and manageability and, ultimately, the consequences of the risk through the generation, or constraining, of ripple effects." (J. X. Kasperson et al., 2003 p.37). So both the technical information, if available, as the socially constructed perceptions are key components of the ripple effect. The second remark is that the amplification processes are much more likely to occur than attenuation processes because of the specific traits of the current (risk) information society. This risk information society is characterized by public content creation (personal information websites, user sites, bottom-up journalism etc.), disclosure, large accessibility but also low source and information credibility levels due to the overload of information and the fact that everybody is able to diffuse their own information about the risks. Fortunately, the fact that attenuation of risks by e.g. governments is not always

possible anymore has obliged them to reconsider the governmental risk management and risk communication policies and strategies. As we will discuss in chapter three, in order to create long-term trust and confidence that are essential cornerstones of policy support, governments and organizations will have to integrate a new approach to risk management. The new approach is more public-oriented and will even have to integrate practices of stakeholder participation.

We will now briefly summarize the social amplification and attenuation of risk framework.

The input from social institutions and structures, such as governments, has an impact on the public construction of risk perceptions, as part of general information processing mechanisms. The starting point is the general assumption that risk events, unless they actually take place and turn into crises, are not really relevant unless people or institutes observe them and communicate them (or a subjectively transformed reflection) to other members of their community. The experience of the risk is therefore not always the physical confrontation and experience with the risk, unless people are personally confronted with the risk. The main focus is on the individual and social perceptions that are the result of various processes on various levels (cognitive, social). Besides the personally constructed risk reality of the individual, the risks can be amplified through various information channels (individual senses, information social networks or professional information brokers) and social stations of amplification. There are diverse channels through which these institutions communicate, both directly as indirectly. This diversity contributes to the complexity of the development process of effective risk communication strategies. The concept of the social amplification and attenuation of risks seeks to advance this search for more comprehensive and integrative approaches. Their conceptual model is depicted in the subjoined figure.

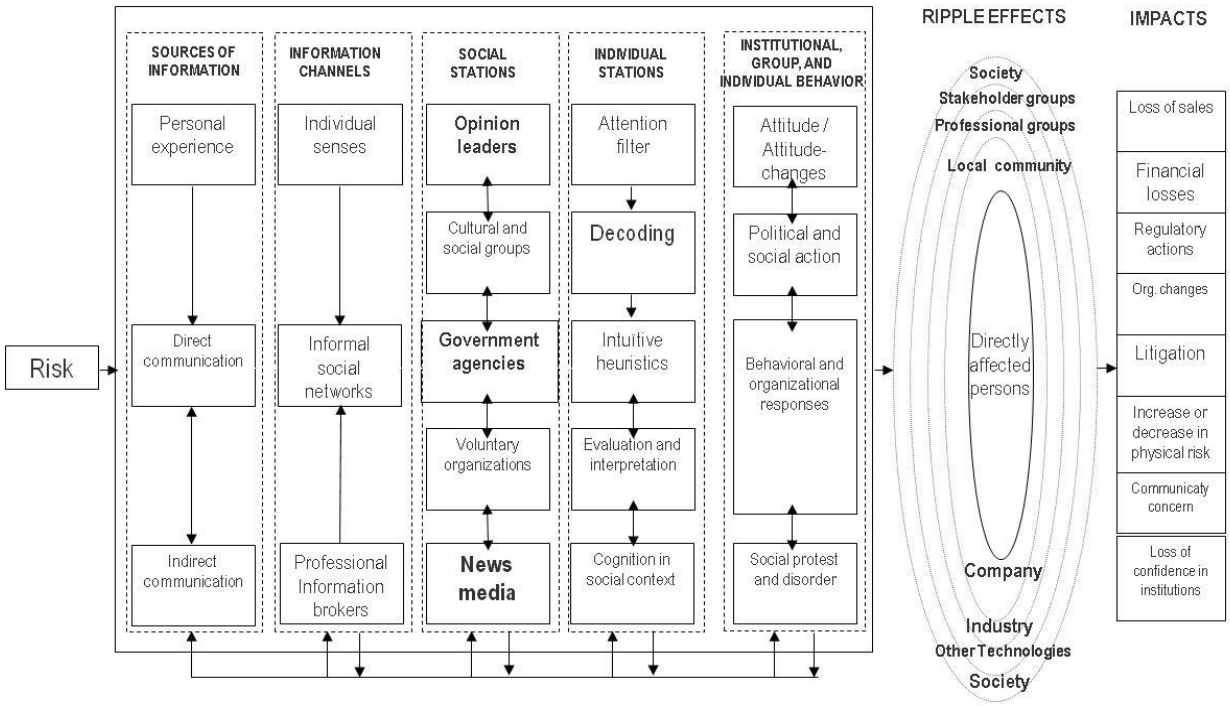


Figure 9: The Social Amplification and Attenuation of Risk Framework (SARF) (Pidgeon, Kasperson, & Slovic, 2003 p.14)

Kasperson and Kasperson stress the fact that the majority of the civil population acquire information more often through information systems (mediated, indirect experiences) than through interpersonal, direct experiences (R. E. Kasperson & Kasperson, 1996). Certain risk communicators, especially the mass media, are large information agents that can amplify or attenuate risk. The construction of risk perceptions is influenced by the quantity of media-attention, the volume of information, the discourse, symbolism and the framing of information etc. Besides informal social networks and personal resources as information exchange platforms, Kasperson and Kasperson mention the importance of professional information brokers. Mass media can be considered very important within this category of information brokers. Mass media can act as watchdogs, gatekeepers and agenda – setters. Among social stations we can find opinion leaders as important informants in one's personal social environment. But as we will discuss in chapter four, the importance and effects of interpersonal communication should not be underestimated, especially in times characterized by information overload and low source and information credibility levels, as mentioned previously. The framework strongly recognizes that the development of social risk perceptions is always likely to be the product of various interactive processes among the various stakeholders in the risk communication process (J. X. Kasperson et al., 2003 p.39). We specifically wanted to focus on the role of opinion leaders as influential social stations within the personal environments of the individual, both physically (e.g. neighbour, family, friends) as electronically (e.g. opinion leaders on blogs, internet forums). Our empirical studies will validate the methodology to identify these opinion leaders and their specific profiles within various risk contexts.

Furthermore, individual attributes of the receiver play a very important role in risk processing. People reduce the complexity of problems by means of cognitive heuristics, but they are influenced very strongly as well by their social environment in the risk evaluation and interpretation process. We will take a closer look at these approaches in chapter four. Last but not least, institutional and organizational behaviour can influence the amplification or attenuation of risks significantly. When collective consciousness or even concern and the social debate about a certain risk is notably present, the consequences can reach further than the persons which are directly involved. This is called the ripple effect. Examples of such secondary or tertiary effects are long-term mental perceptions and attitudes, influence on local or regional economics, erosion of public trust in governments, social conflicts etc. The conceptually conceived ripple effect opens the debate concerning the confrontation of risk concrete assessment strategies with broader, societal consequences.

May authors have used the model to indicate the role of both the media as interpersonal communication in this process of social amplification and attenuation of risks (Wilkins & Patterson, 1990). Paul Slovic has postulated that the media play an important role in the social, or should we say 'medial' amplification of risks, where a variety of cues exaggerate certain risks (especially low probability risks) and create some sorts of 'ghost threats' (Slovic,

1986). Nimmo and Combs have performed studies in the context of political communication and came to findings that support this viewpoint as well (J. Combs & Nimmo, 1990).
We could state that it is probably wisely to state that the media do play an important role and have a responsibility to inform and warn the public about impending threats and risks, but so has governmental institutions that will have to 'use' these media as information channels. We will now extensively discuss the threat of terrorism as a new and primarily socially and medially constructed risk.

7. Case: terrorism as a new and untransparant risk

7.1. Introduction: defining terrorism

Since the attacks of 9/11 2001 on the Twin Towers, the Madrid bombings on 11th March 2004 and the London bombings on 7th July 2005, the communal sense of vulnerability has increased tremendously and 'terrorism' has become a risk that affects the minds and hearts of people all over the world (Gearson, 2002). The public perception and the psychological impact of terrorist attacks has increased as well (Krewski et al., 2006). As we will see further in this dissertation, perceptions of a threat, like terrorism, can lead to adverse effects on psychological well-being, inter-group relations or even the economy (Slovic, 2002).
Under the Bush administration, the 'War on Terrorism' or 'Global War on Terror' strongly dominated the national (U.S.A.) and international political agendas. Other scholars also agree that since 9/11, terrorism has settled itself high up the national and international political agendas (Curtis, 2004; Furedi, 2005; Rothe & Muzzatti, 2004). The definition of 'terrorism' has become far more complex and abstract after the 9/11 attacks as the dreadful events have not only cost more than 3.000 human lives, but they have also induced a global shock wave and even induced arousal and even fear within certain communities.
Depending on the perspective that is used, Picard makes a distinction between legal, political, psychological and moral definitions of terrorism (Picard, 1993). Picard mentions that there are increasingly more authors that construct and use broader definitions of terrorism, combining various approaches. His definition of terrorism is a nice example of a similar 'broad' definition:
"violence or threat of violence, designed to induce fear, as a strategy for achieving some goal" (Picard, 1993 p.4).
In addition, Picard distinguishes several modes of terrorism: pathological terrorism, criminal terrorism and political – social terrorism. The last category, the political-social terrorism, is the key concern in his book. According to Picard, terrorism involves three types of actors: the terrorists as principal actors, the authorities and the media. Naturally, terrorism also involves a fourth group: the victims and their relatives. However, Picard considers this last group of people not as actors, but rather as instrumental elements that are used by the previously mentioned actors.
Combs defines terrorism as *"a synthesis of war and theatre, a dramatization of the most proscribed kind of violence -that which is perpetrated on innocent victims-played before an*

audience in the hope of creating a mood of fear, for political purposes" (C. C. Combs, 1997 p.8).

Combs proposes five vital elements to describe terrorism: violence, an audience, the dissemination of fear, innocent victims and political objectives.

Coolsaet has described the following elements of terrorism (R. Coolsaet, 2005; R. Coolsaet & Van de Voorde, 2004): terrorism involves groups that are not bound to state that want to achieve political aims by pursuing these aims in a way that is non conventional to the existing norms of political action. Their primary aim is to evoke and induce fear and a shock wave among communities and even entire societies, rather than eliminating their direct opponents physically. Very often, symbols of power (e.g. the Twin Towers as symbols of the economical power) are their primary targets. Coolsaet also provides some other specific traits of contemporary international terrorism. A first trait is the international and global character. A second trait includes the fact that the 'enemy' is omnipresent and elusive. Contemporary terrorism is also characterized by a revolutionary philosophy: it legitimates itself as being revolutionary, transcending all local boundaries. A last trait is the general conviction that it is absolutely necessary to cooperate internationally to 'defeat' international terrorism.

Schmid and de Graaf also contribute to our perspective on the definition of terrorism. They use the terms 'insurgent terrorism', to indicate the nature of terrorism (Schmid & de Graaf, 1982). They specify insurgent terrorism as *"social-revolutionary, separatist and single issue terrorism aiming at the top of society"*(Schmid & de Graaf, 1982 p.1). This implies that the violence that accompanies terrorism in this sense is primarily committed because of the effects that are induced within the entire community. Schmid and Paletz also mention that insurgent terrorism does not necessarily have to bring along many victims or material damage. Insurgent terrorism primarily prospers when the acts gain large visibility through various media (Schmid & Paletz, 1992). Naturally, these definitions of insurgent terrorism were developed before the attacks of 9/11 so the specific definition of Schmid and de Graaf, using separatism and the single issue character of terrorism, is not always valid anymore in contemporary terrorist actions. We can state that most of the actions that are defined as 'terrorist' actions in the post 9/11 age can mainly be labelled as more abstract, taking place on the psychological level with a high degree of insurgence. Contemporary terrorism is very much likely to be socially and medially constructed and amplified. It does not always have to be present to be efficient in its intended effects. Besides scrutinizing the real threat of terrorism, governments and academics should also focus on the imagined or personally perceived threat of terrorism (Archetti & Taylor, 2003). This is one of the reasons why contemporary terrorism can be labelled as a 'new' risk or should we state that 'new terrorism' has become a new risk (Mythen & Walklate, 2006).

7.2. Terrorism as a 'new' risk

Beck's perspective on the "new risk" has been used to define new risks as risks that can no longer be perceived with the human senses through direct perception. He formulates some characteristics of the new risks: the presence of the new risk is mostly ascertained by experts, the consequences are irreversible, the risks are no longer bound to time or location and the possible damage of the new risks is so large, that previous responds such as insurance and responsibility are deficient. De Vroom, Bal & Van der Velden add a fifth trait: the fact that scientific judgements are no longer collectively trusted and accepted (J. Gutteling, Havenaar, Merkx, van Dijck, & Rip, 2004). Contemporary terrorism can be considered as a new risk because of its amorphous and non transparent nature, which implies that the risk of terrorism is not bound to time or location, the possible consequences are irreversible and can cause great damage and responsibility cannot always be allocated to one particular person or group. So the terrorist threat can not only be perceived as a new risk, but also as a 'ghost' threat. The unpredictability, incalculability and uncertainty in both the likelihood of occurrence as well as the extent of its consequences of terrorist attacks (Kunreuther, 2002) indicate that risk assessment and risk management processes in the context of these 'new risks' are limited (Ericson & Doyle, 2004). For the public, the risk of a terrorist attack indicates the illusion of a fully managed risk and reminds us of the uncertainty of the future. Knowing this, we can state that communicating about terrorism is a very complex assignment. The risk is constructed in the hearts and minds of people, who base themselves on information that is either actively or passively retrieved from the media, government communications, opinion leaders or other information brokers. These individual perceptions influence people's behaviour. The SARF posits that the media function as transmitters of risk information that was retrieved from various sources, such as scientists, agencies, eyewitnesses and governments. It integrates the general public as risk information receivers and adds a feedback loop through which public response can influence the future communication activities of the sources. In the context of terror we can integrate the following question: 'to what extend do the media, as elements of cultural and social factors in general, play a role in the social attenuation or amplification of risk perception concerning terrorist threats?' When collective consciousness or even concern and the social debate about a certain risk are notably present, the consequences can reach further than the persons which are directly involved. This is called a ripple effect. Examples of such secondary or tertiary effects are long-term mental perceptions and attitudes, influence on local or regional economics, erosion of public trust in governments, social conflicts etc. The conceptually conceived ripple effect opens the debate concerning the confrontation of risk concrete assessment strategies with broader, societal consequences.

7.3. The medial amplification of terrorism as a risk

Various scholars have mentioned that the promotion and amplification of certain risk issues by the media can help set the agenda on a certain issue and hence amplify or attenuate the

risk perception and sense of danger (R. E. Kasperson & Kasperson, 1996; Philo, 1999; Schlesinger, Tumber, & Murdock, 1991; Wray, Kreuter, Jacobsen, Clements, & Evans, 2004).
Terrorism distinguishes itself from other criminal practices by the intensity and extensiveness of its consequences. The destructive consequences of a terrorist attack reach much further than the primarily targeted victims. Besides the effects on the first level (victims, structural damages etc.) a strong ripple effect may be induced on various levels and structures of the society. Moreover, the mere threat and the risk that is launched are sufficient to cause certain ripple effects. This social induction of a culture of fear is the cornerstone of a number of ripple effects. Within this lies the importance of scrutinizing both processes of individual risk perception as social risk perceptions. How are they constructed? Who are the key social stations and information agents in these ripple effect processes? The public's reliance on the media as information sources about the risk of terrorism stresses the need for reform in the dissemination of information about such risks by the media. Since the media, and in particular mass media, are very convenient because of their availability and accessibility, they are very likely to play a vital role in the provision of information on terrorism to the public (Krewski et al., 2006).

7.4. From the risk society to the war on terror

In "Risk and the war on terror" (Amoore & Goede, 2008) the authors depart substantially from Beck's thesis about the feigning of control over the uncontrollable (Beck, 2002). They claim that it is the feigning of control that has induced and dominated the rise in risk discourses in the war on terror. In fact, it is the appearance and the collective perception of the sustainability of securability and manageability. Several critical risk studies (Adam & Loon, 2000; O'Malley, 2000), point out that risks cannot be isolated as tangible, controllable events. The risk of terrorism is constructed medially, socially or institutionally.
"The variable modalities of meaning that attend terrorism are the products of socially constructed realities"(Greisman, 1977 p.304).
Amoore and De Goede (2008) state that considering risk as the dominant technology of the war on terror includes the engagement in practices and policies that are enacted on behalf of managing risk and uncertainty. They connect the proliferation of risk techniques to a particular mode of governing, *"(…) a means of making an uncertain and unknowable future amenable to intervention and management."* (Amoore & Goede, 2008 p.9)

7.5. The gap between reality and perceived reality as induced by facts and figures

In 2001, Larry Johnson, a former counterterrorism specialist in the U.S. Department of State made a critical assessment in the New York times, claiming that, based on empirical data, the threat of international terrorism was blown out of proportion by several information agents (Nacos, 2002). These information agents comprise firstly the media, who are mostly in search of drama and sensational items with high news value. Secondly we can appoint various pseudo-scientists, who claim expertise and communicate without hard data and

thirdly we include politicians, who use the terrorist threat as a ghost threat that can only be controlled by them, legitimizing their expenditures for redundant and questionable counterterrorist measures. Very often, the perceptions about terrorism are distorted because of a miscommunication of facts and figures that are generally emphasized too strongly. Many authors claim that there is a strong discrepancy between the objective numbers of casualties of terrorist attacks and the medial and political attention that has been attached to the 'terrorist threat'. Pillar used raw data to prove this discrepancy in an American context (Pillar, 2001).

Walter Laqueur also tried to scrutinize facts and figures about international terrorism in an objective manner. He concluded that there were not more civilians killed in terrorist attacks in 1984 than in 1974 and he rejects the these that the number of . He ends by stating that *"there is a tendency to magnify the importance of terrorism in modern society"* (Laqueur, 1986 p.100).

Coolsaet and Van de Voorde analyzed the figures of the "Patterns of Global Terrorism". This annual report is drafted by the State Department in assignment of the United States Code (Title 22, Section 2656f(a)) and it contains facts and figures concerning the large-scaled terrorist incidents all over the world and much additional information. Based on the MIPT Knowledge Database (combination of the RAND Terrorism Chronology and the Terrorism incident database), the statistical analysis of the amount and scale of international terror attacks indicates a strong structural decrease in the amount of attacks. On the contrary the amount of victims involved in the attacks has increased. Of course, the horrible and bloody attacks on 9-11 2001 boost the mean amount of victims as thousands of people were killed in one single attack.

They conclude that, during the period of 1977-2003, terrorism as political instrument has lost its importance and effectiveness. Because of the decrease of the number of countries who consistently support international terrorism, the probability that terrorist groups will use weapons of mass destruction has decreased. There has been allocated a disproportional amount of attention to the 'worst case scenario's' that predict the use of chemical, biological and nuclear weapons and an immense quantity of victims.

Coolsaet and Van de Voorde conclude their paper with the statement that there is a wide gap between perception and reality. The dominant short term perspective prevents that the fundamental causes of terrorism can be scrutinized using objective approaches (R. Coolsaet, 2004 p.9).

We cite Nacos to conclude this paragraph:

"The events of September 11, 2001, changed the mindsets of Americans-including those in the mainstream media. As a result, the news reflected and reinforced the views and policy preferences of the administration, the political elite and the vast majority of the public" (Nacos, 2002 p.160).

7.6. The media and terrorism

In their article, 'Violence as communication : insurgent terrorism and the western news media', Schmid and de Graaf advocate that terrorist violence is a type of language that has to be considered as a communicative act as such (Schmid & de Graaf, 1982). Picard does not entirely agree with this. As terrorist acts are meant to induce a change in attitudes and to promote certain behaviour, Picard thinks we should consider terrorist violence as a form of persuasive communication (Picard, 1993). Moreover, he considers terrorism as a communicative act, as only one of the vital elements in a more extensive strategy.

There are various approaches to the role of the media in this process. Picard states that the most important element in the communication efforts about terrorism is not the event as such, but it are the connotations and the meanings that are assigned to these events by the governments, the media and the general population that play the lead role (Picard, 1993). Since the media largely cover terrorist events and the media coverage in the aftermath of the events may last for weeks, months and even years, a very broad audience is reached. Combs mentions that the effects of the events are strongly amplified by the media (C. C. Combs, 1997). The tendency of sensationalism in media coverage combined with terrorist groupings that (ab)use this media attention has introduced an important discussion about the complicity of the media to contemporary terrorism. Combs summarizes different perspectives of various scholars in this discussion. He refers to Hacker, who states that *"if the mass media did not exist, terrorists would have to invent them. In turn, the mass media hanker after terrorist acts because they fit into their programming needs: namely, sudden acts of great excitement that are susceptible, presumably of quick solution. So there's a mutual dependenc."* (Hacker, 1979 in Combs 1997 p. 143-144). Laqueur states that "*The media are a terrorist's best friend…terrorists are the superentertainers of our time"* (Laqueur, 1987 in Combs 1997 p.144). Combs also cites Tanter: *"Since the terror is aimed at the media and not at the victim, success is defined in terms of media coverage. And there is no way in the West that you could not have media coverage because you're dealing in a free society"* (C. C. Combs, 1997 p.144).

These perspectives are all very critical about the negative perceptions of the role of the media. Picard does not entirely agree with these negative critiques. The idea that the media play a pathological role in the media coverage of terrorist events has to be more differentiated. Terrorism is a dramatic and symbolic tool to express power. The mass media possess the possibility to magnify and disseminate this message worldwide. According to Picard, the media do not cause terrorism, but they can amplify and aggravate the effects of terrorism by providing bad media coverage that prefers to sensationalize rather than inform and allow people to have a better understanding of the issues. Wiegman and Gutteling also agree that the media's preoccupation with the sensational, exceptional and negative aspects of risk events has been deemed responsible for the public's elevated concern over certain risk issues (Wiegman & Gutteling, 1995).

Picard pones that the critiques on the media coverage of terrorist events are based on certain assumptions that are not correct (Picard, 1993). Certain critics, like Hacker, argue that media coverage is an essential element in the existence and survival of terrorism. The simplistic argument that terrorism occurs exactly because of the fact that it is covered extensively by the media is evidently unfounded in Picard's opinion. He enervates the statement by mentioning that terrorism has always existed, even before the mass media (audiovisual and printed media) arose. The only necessity is the condition of communication, and communication is not necessarily dependent on the media. This point of view is clarified by the fact that terrorism also exists in totalitarian societies where the government strongly controls and censors the media. Moreover, in countries where the media are less dominantly present, the consciousness of the violence brought by terrorism is not less. However, he states that, although the existence of (mass) media are not necessarily a condition for the existence of terrorism, the media can be used as effective and efficient tools for terrorists to amplify the effects of their actions and to induce and disseminate arousal and anxiety. On the other hand, the media can also play a positive role by providing their public with information about terrorism and the underlying issues. Imposing restrictions to the media is not a solution at all since non-communication and miscommunication may lead to misunderstandings and aggravate fear levels because the people's need for information is not satisfied and the culture of distrust is stimulated. Risk perceptions are not lowered by withholding information, on the contrary, fear levels will raise when people are less knowledgeable and they feel that they are not in control of the information. Information insufficiency lowers the levels of perceived control and may even induce fear and arousal. The discussion about the role of the media in the context of terrorism is still very alive and many questions are still unanswered. Probably because of the multifaceted and ever evolving nature of the risk of terrorism and more importantly, of the evolving information tools that can be used in the contemporary mental warfare. The idea that terrorists use media as weapons to dominate hearts and minds of people is acceptable. It would be very ironical however that one of the most important, fundamental liberties of a 'free' and democratic society, namely the free press, would become an instrument for its own destruction (C. C. Combs, 1997). We agree that the media are important tools that are precisely manipulated by terrorist groups. On the other hand, we are convinced that the enemy should be confronted with similar armory. The mass media can be useful tools for governments to increase communal resilience and defeat the mental blackmail by providing trustworthy, relevant and objective information that proves that the governments, as risk regulators, are prepared to counter terrorist actions.

7.7. The relationship between the media and the government in the context of terrorism

The relationship between the media and the government is of great importance for studying terrorism as a socially and medially constructed risk. Governments very often criticize the style of media coverage. They agree that, by emphasizing the threat and the violence,

anxiety and arousal is evoked. This is exactly what terrorists aim at. They often criticize the sensationalist approach of reporting certain news facts and point out the lack of context, historical notions and comprehension of the more complex social and political issues that are involved. This induces a miscomprehension with the public of what terrorism is. According to Picard, the risk of terrorism is overestimated. As mentioned in 7.5., many scholars agree and base themselves on objective facts and figures about terrorism to illustrate the gap between the objective reality and the perceived reality, as induced and stimulated by the media. Picard also mentions that fear is not only induced through the media, the governments may also function as important information agents that diffuse information which feeds communal arousal and anxiety (Picard, 1993). So it will be vital for governments to create a good risk communication policy in the context of terrorism, focusing on increasing preparedness (Wray et al., 2004) and resilience by providing objective, useful information about terrorism. Instead of non-communication and miscommunication, a more open information policy should be implemented. If the trust in the government as a risk communicator is stimulated the general trust in the government as a risk regulator will increase as well (Mythen & Walklate, 2006).
So knowledge is the key to resilience. Unfortunately, knowledge is distorted by patterns of media coverage on the one hand and by manipulation of terrorists and governments on the other hand. We will conclude by citing Lemyre et al., who state that *"improving relationships between the media and government and engaging the media as explicit stakeholders in the risk management process may prove a very efficient vector of preparedness"* (Krewski et al., 2006 p.770).

7.8. Governmental risk communication in the context of terrorism as a new risk

For governments, communicating about terrorism is a very delicate assignment as they have to find the balance between creating awareness and avoiding the induction of a culture of fear (Altheide, 2006; Mythen & Walklate, 2006), taking into account the growing consciousness of the public of their "right to know" about the risks they face in order to improve societal decision making. We integrated one of the most appropriate examples of risk communication about terrorism that would rather induce a culture of fear or contradictory erode general trust and confidence in the government. The subjoined figure is the well-know color coded Homeland Security Threat Level Advisory System, developed by the U.S. Department of Homeland Security in 2002.

Figure 10: Figure: Color coded Threat Level Advisory System (U.S. Department of Homeland Security 2002)

There was a lot of criticism on this system, especially because the threat level has entered the blue or green zone (Homeland Security Advisory Council, 2009 p.12). According to the Task Force of the Homeland Security Advisory Council, this was due to *"A reluctance of the government to b ring down color alert status after it has been elevated, leading to public cynicism about the color status*" (p. 5). Even the Homeland Security Advisory Council had to admit that the system missed its key objective and that *"there is currently indifference to the Homeland Security Advisory System and, at worst, there is a disturbing lack of public confidence in the system" (Homeland Security Advisory Council, 2009 p.2).*

In a governmental report of September 2009 (appendix), the Homeland Security Advisory Council unanimously concluded that constructive measures should be taken to increase the general public confidence as *"The system's ability to communicate useful information in a credible manner to the public is poor. Significant rethinking of how to communicate to this audience is warranted" (Homeland Security Advisory Council, 2009 p.1).*

The Task force provides several advises to restore public confidence and raise the credibility in the advisory system for instance by targeting communications, providing more specific information on new threats, accompanying new alerts with actionable steps the public can take, provide information about the level of credibility and confidence in the threat information, redirecting people to additional sources of information and to guarantee fullest transparency. These guidelines strongly reflect the traits of public oriented risk communication strategies. We will extensively discuss the specific characteristics of this approach to risk communication in the next chapters.

Naturally, taking into account the growing consciousness of the public in societal decision taking requires a strong reflection of policy makers on the balance between the "right to know" versus the need for security. At a meeting, hosted by Vanderbilt Centre for Environmental Management Studies, strong emphasis has been put on the research needs to understand the trade-off between the public's right to know versus homeland security and civil security (M. A Cohen, 2002). Cohen mentions that a vast amount of web pages and documents that were available for public reading have been withdrawn since the attacks of

9/11. He states that "*the concern for homeland security has led to a wholesale reatreat from the transparency trends of the past decade"* (M. A Cohen, 2002 p.369).
The key question of the panel discussion that is reported in his paper was whether *"reducing the amount of information available to the public increase or decrease the risk to communities or emergency responders"* (M. A Cohen, 2002 p.368).
Information disclosure programs, implemented by governments, have been proven both theoretically and empirically to induce effective improvements in environmental quality and emergency preparedness (M. A Cohen, 2002; M. A. Cohen & Santhakumar, 2007; Konar & Cohen, 1997; Maxwell, Lyon, & Hackett, 2000).
We emphasize that the notion of 'information' is not specific enough. Not all information is potentially harmful for national security. Non-communication is even worse because a lack of information induces uncertainty and will affect the personal and social resilience.
Transparency can contribute to increase general confidence in the governments as risk regulators and increase credibility of the information that is provided. The fact of consultation of the government as information source about terrorism (Krewski et al., 2006) relates to the issues of trust and confidence. Also the involvement and engagement of the public in the risk communication process will improve trust in the government (Jones, Woolven, DurodiÃ©, & Wessely, 2006). We will discuss these issues of trust and confidence and necessity of stakeholder participation in the risk communication processes more extensively in chapter three. Lemyre also mentions the importance of friends and relatives as risk information sources and personal support in the terrorism context (Rubin, Brewin, Greenberg, Simpson, & Wessely, 2005; Schuster et al., 2001) and as potential contributors for public engagement in terrorism risk management processes (Krewski et al., 2006). We will specify this by incorporating the concept of opinion leadership. The importance of interpersonal communication in risk contexts and the role of opinion leaders as credible and reliable information sources will comprehensively be discussed in chapter four.
Governmental risk communication is about finding the balance between stimulating preparedness by creating a risk consciousness and the induction of a culture of fear.
As Smith and McClosky state, it is crucial to avoid moral panics and inducing cultures of fear in the context of certain risks but then again governmental officials should disclose a sufficient amount of information to ensure that the people can make well-informed judgments and choices, amongst others concerning the acceptability of the risk (Smith & McCloskey, 1998). The way in which risk issues develop and become framed is a very important issue in the risk debate. Risk issues may escalate beyond levels justified by the available (scientific) evidence because of the ripple effects resulting from the social and medial amplification process. Some authors have referred to the emergence of distorted risk perceptions as 'moral panics' (S. Cohen, 1972; Young, 1971). In the process of moral panic creation, the media, publics and the risk regulators (authorities) are perceived to be crucial players in the escalation of concerns and the amplification of the threats. Besides these players, politicians and action or pressure groups are also perceived to have an incredible influence on the emergence of such panics (Smith & McCloskey, 1998). Initially, Cohen and Young focused on the issue of moral panics in the context of deviant behaviour. Goode and

Ben-Yehuda however have applied the approach to explain the social amplification of risk processes (Goode & Ben-Yehuda, 1994).

Mythen and Walklate (2006) have used the example of the UK governmental risk communication strategy as an example of good an transparent risk communication in the context of terrorism. In response to the general trust deficit, the UK government has developed specific risk communication strategies that are aimed at communicating transparently, effectively and regaining trust and confidence. The Strategy Unit Report "Risk: Improving government's capability to handle risk and uncertainty" (Strategy Unit Report, 2002) is a document that was written by the Cabinet's Office in 2002. The document is a response the general call for openness and transparency about risk issues. It advocates the stakeholder participation model in risk communication. It refers to 9/11 as the key starting point for governments to make open and honest information practices a key priority. Naturally, the depth and range of the information that is provided to the general public will depend on security concerns. The Cabinet Office clearly states in this report that there is a substantial need for governments to be open, especially in times of uncertainty, and that the government also has a vital role to play as trustworthy and reliable information broker or risk communicator. Taking a glance at the documents that are publically accessible and at the websites of other UK governmental institutes and offices, we noticed that these websites offer many opportunities to consult various governmental documents and they actively provide much information about emergency preparedness and institutional security strategies. We briefly assessed the websites of the UK Resilience Center (Cabinet Office, http://www.cabinetoffice.gov.uk/ukresilience), MI5 (security services, http://www.mi5.gov.uk/) and MI6 (Secret Intelligence Services, http://www.mi6.gov.uk/output/sis-home-welcome.html). Obviously, in order to drawn empirically supported conclusions about the nature of the information that is offered and about the discourse that is used, we should design a customized research design, for instance the combination of a qualitative and quantitative content analysis. It is not the scope of this dissertation to perform content analyses on governmental risk communication efforts, however, we strongly agree that the outcome of similar empirical studies would have great added value.

8. Conclusion

From the 'taxonomy of disasters and risks', developed by Wilkins and Patterson (1990), we could distillate that the core definition of risks in our approach to the matter, is closely related to concept of 'opaque' risks. We can state that opaque risks are largely defined by their political and social connotations. We find very strong similarities in the specific traits of opaque risks with the 'new risks' as defined by Ulrich Beck in his new risk society perspective. That is why we used Beck's perspectives on the new risk society as one of the theoretical cornerstones that underlie our approach to the key concept of 'risk'. His sociological perspective on the 'new' risk society is very valuable and has created new looking glasses that can be used to scrutinize risk perceptions on all levels of analysis:

cognitive, socio-psychological and sociological. However we did agree with the main critique that his theoretical perspectives lack empirical foundations. Lupton and Tulloch mentioned that very little theoretical and empirical research has been established about the ways in which notions, narratives and knowledge about risks, and certainly the 'new' risks are developed, understood and embedded in the social environments of people (Lupton & Tulloch, 2001). As a response, we concluded that there are many disciplines that scrutinize these issues, but they are all fragmented over several academic disciplines. We should come to a holistic approach, integrating cognitive perspectives. We developed a brief overview of the central theories and perspectives that will be integrated in the theoretical body of this dissertation.

The empirical body will develop and validate a methodology that incorporates the general concepts that are originated from these key perspectives. The methodology will be validated in three different risk contexts: terrorism, avian flu and the financial economical crisis. We also added an attempt of a categorization of new risks with their specific traits. Because risk research comprises a very extensive and multidisciplinary offer of approaches, we incorporated and discussed the overview and classification of Renn (1992) and pointed out the fields that are incorporated within the scope of our dissertation. We concluded that the social amplification and attenuation of risk framework (SARF), as developed by Kasperson et al. (1996), is the perfect framework that can serve as a cornerstone for our theoretical and empirical objectives. We concluded this chapter by applying the main concepts of the new risk society and the social amplification of risk in the context of terrorism as a risk. As 'contemporary' or 'new' terrorism is primarily socially and medially constructed, it is a very nice example of a 'new' risk, as defined by Beck. We discussed the gap between the reality and the perceived reality, based on concrete facts and figures that illustrate that the 'real' threat of terrorism is overestimated. However, we do think that the effects of terrorism may be stronger when it comes to the ripple effects that are induced and amplified by various information agents and social stations, as defined by the SARF. The media are responsible for sensationalizing and amplifying the risk of terrorism. Some even discuss the possibility that the media and even governments are inducing and harnessing a culture of fear. Proper communication on terrorism, together with a demonstration of safety and emergency scenarios should actually lower the feelings of fear and potential risk – thus enhancing resilience – while inadequate communication has proven to undermine public trust – thus decreasing resilience. The well-known dilemma for governments is 'informing but not alarming' and the problem arises when the public is left in an information vacuum and media start to speculate (Archetti & Taylor, 2003; Durodié & Wessely, 2002) or in the most negative scenarios when the government lies, misleads or gives too alarming, incomplete or complex information for frightened citizens to respond to in an appropriate manner (Speckhard, 2005). This chapter already provided some general introductions to the main topics that will shape both the theoretical as the empirical bodies of doctoral dissertation. The next chapters will extensively discuss the concepts of risk management and risk communication, risk perception and public oriented risk communication and trust and reliability as drivers for effective governmental risk communication.

CHAPTER TWO

RISK COMMUNICATION

1. Risk communication in risk management processes

This second chapter will commence with a review of literature on risk communication as a vital element in risk management processes. We will discuss various risk management models and indicate the position and the function of effective risk communication within these models.

1.1. Miscommunication and non communication as indicators of mismanagement

One of the first academic works that has been published about risk communication is 'Risk Communication' in 1987 by Davies, Covello and Allen. The book contains the proceedings of the National Conference on Risk Communication held in Washington, D.C. in 1986. Clarence Davies, one of the editors, reflects very accurately a fundamental problem statement that is characterizing for the process of risk communication.

"(…) the risk communication process is very often unsatisfactory for everybody involved. Those who send messages often feel that their messages have not been received, and the recipients often feel that their questions have not been answered. In short, both miscommunication and non communication occur in the risk communication process" (Davies, Covello, & Allen, 1987b p.2).

Non communication is somewhat the worst scenario in a risk and crisis situation. There can be various reasons for non communication. Authorities are afraid to communicate about the risk as they do not know what the consequences can be of diffusing certain information into the society. Of course, authorities are always confronted with the duality of creating a certain level of preparedness on the one hand and inducing a culture of fear on the other hand. In order to avoid the induction of climate of arousal and even fear, governments will sometimes opt for non communication rather than taking the risk of inducing concern and even panic. A second reason for non communication, which is also related to the first one, is that there are often no lucid and well-considered risk communication strategies at hand. Instead of improvising a short term risk communication strategy, authorities sometimes prefer non communication to avoid miscommunication with negative effects. Naturally, the lack of a risk communication strategy mostly results from a lack of a risk management strategy or an underestimation of the vital role of risk communication in the risk management process.

Miscommunication can in our perception be even worse than non communication, depending of the risk context of course. The nature of the information that should be

diffused depends completely on the risk or crisis context, the objectives of the authorities and the risk information desires of the public. In order to avoid miscommunication, one should take into account these three elements when constructing risk communication programs. Making communication programs public oriented will be a crucial element in their effectiveness and will avoid miscommunication.
So avoiding both miscommunication as non communication can be considered as fundamental drivers for the development of well-considered, audience targeted risk communication programs that are the most vital elements in the entire risk management process. Let us first discuss the academic views on the processes of risk assessment and risk management in which risk communication will be embedded.

1.2. Risk assessment and risk management

Risk management can be defined in as many statements as there are risks. In general, we could put out front three main purposes of risk management (Grima, 1989). The management process should allow us to control and reduce risks to acceptable levels, it should reduce uncertainty and doubt in risk decision processes and it should have the aim to increase public confidence. All three objectives involve information flows between various stakeholders: risk experts, decisions makers, mass media, and the public.
Leiss (1989) mentions several national and international organizations, including the National Research Council (°1983, U.S.), the Royal Society Study Group (°1983, U.K.), the Interdepartmental Working Group on Risk-Benefit Analysis (°1984, Canada) and the World Health Organization (°1985). These organizations have developed several models and tools to scrutinize and summarize the key elements in risk management processes. The Working Group on Risk Assessment and Risk Management developed a basic framework for risk assessment and risk management (Leiss, 1989b). The dual nature of the model (risk assessment and risk management) suggests that the working group considers assessment as a separate process that precedes the actual risk management process. The risk assessment process includes an analytical phase, in which the hazards are identified and probability figures are delivered, and an option evaluation phase, in which the concrete options are developed and analyzed. The output of this phase will feed the decision taking stage, the first step in the actual risk management process. Within this process, the actual selected strategy will be implemented, monitored, evaluated and reviewed.

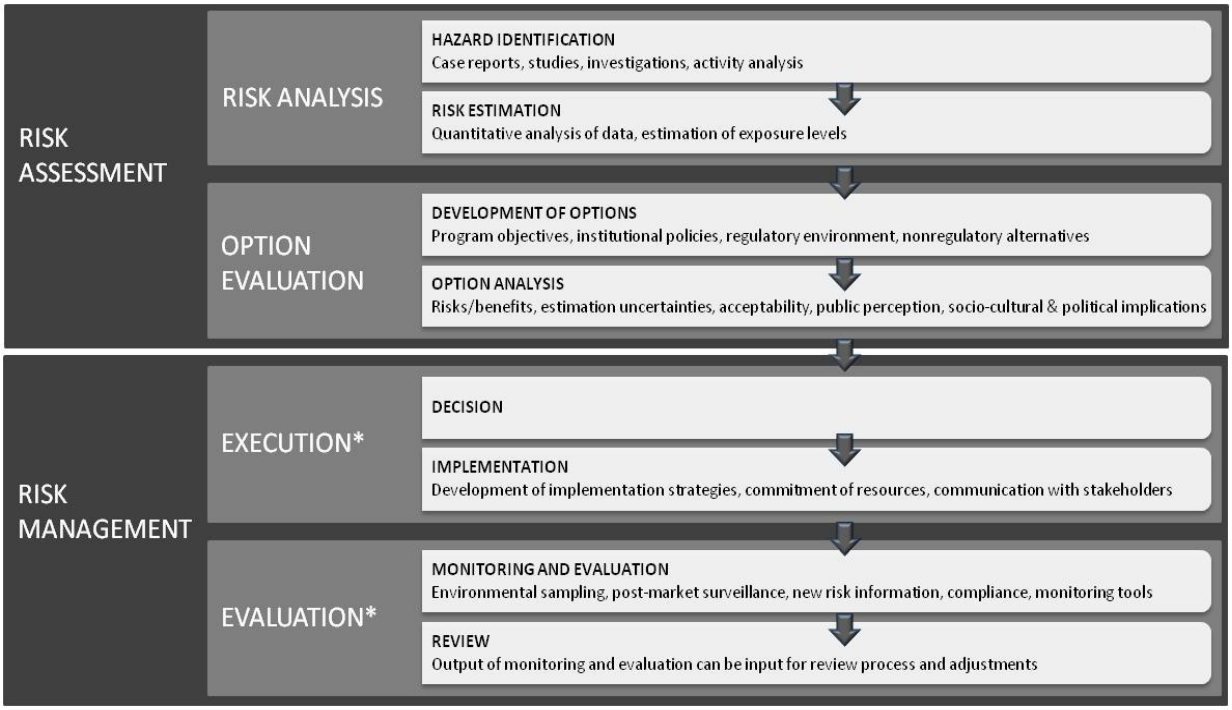


Figure 11: The risk management process (Leiss, 1989b p.92)

The following critiques on the model can be formulated:

- The first critique questions the division of risk assessment and risk management. Risk management is perceived as a consequent phase of the risk assessment stage. We would consider risk assessment as a fundamental phase within the risk management process and classify the execution and evaluation phase under a different label: e.g. the strategy implementation phase.
- Secondly, the model is very linear and does not allow any cross-connections that allow, for example, input of stakeholders in the hazard identification or option development phases. As we will confirm further in this chapter, stakeholder participation in all phases of the risk assessment and risk management processes is a crucial and significant index to increase the effectiveness of these management processes.
- The third critique is that communication comes in only at the second phase of the risk management process. Since the transfer and especially the exchange of information of the various stakeholders with the risk management bodies is crucial in the option development and option analysis phases as well, communication should be considered as an overall lubricant in the entire assessment and management process.
- The last critique addresses the evaluation and monitoring phase. Both monitoring as evaluating are essential throughout the entire process. Since we advocate the involvement of various stakeholders throughout the entire process, the evaluation and monitoring of the output of the reconciliation of these information flows is absolutely necessary.

We advocate that the entire process of risk assessment and risk management has to be considered as a holistic and more integrated process which is very complex and allows many

cross-connections between the various stages. Secondly, we believe that risk information transfer is a crucial ingredient in all phases of the risk management process (analysis, assessment, solving, etc.). It is often stated that the complexity of developing solid risk communication strategies is closely linked to the complexity of the risk management and the risk decision process itself (Grima, 1989; Keeney & Vonwinterfeldt, 1986; Leiss, 1989b).
O'Riordan has visualized the functions in environmental risk management by means of the subjoined scheme (Handmer & Penning-Rowsell, 1990 p.10). It involves four main phases: risk identification, estimation, evaluation and control.

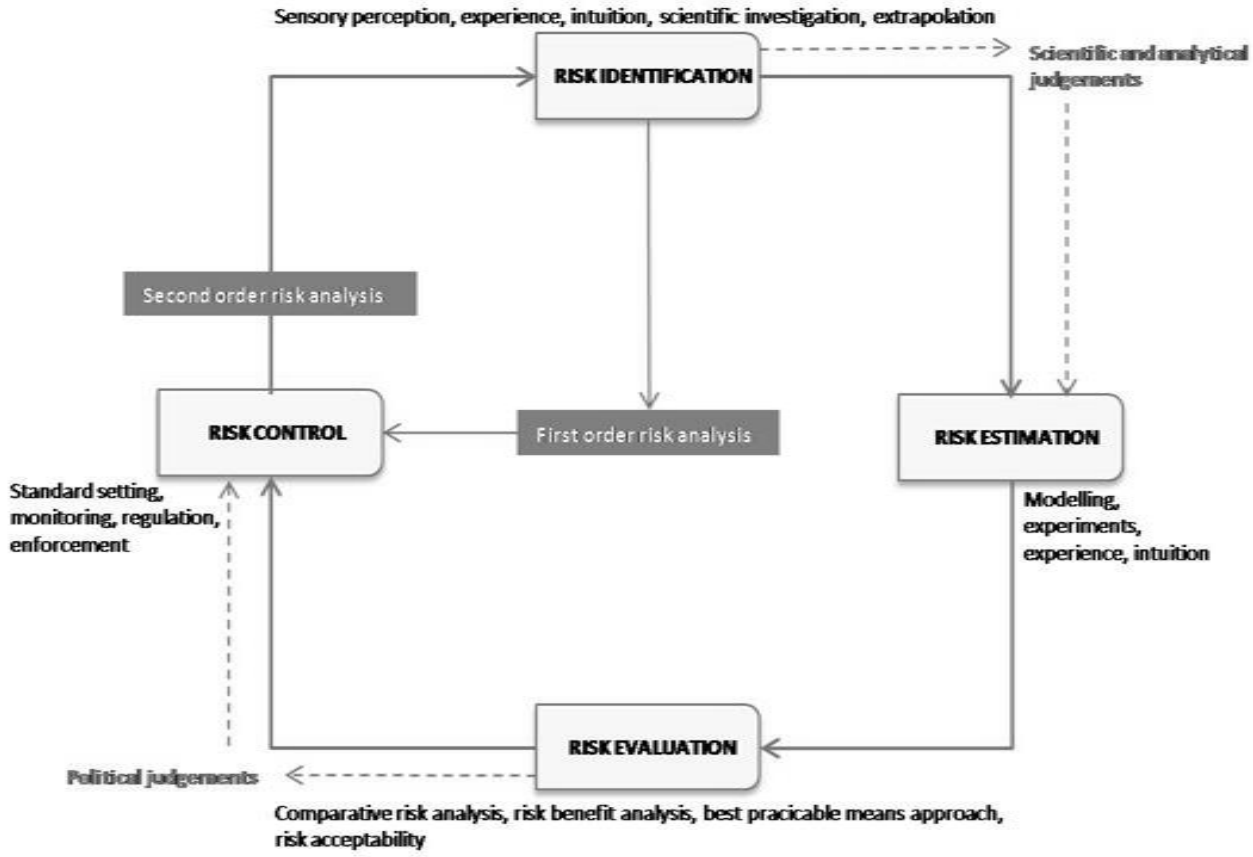


Figure 12: Schematic visualization of the functions in environmental risk management (Handmer & Penning-Rowsell, 1990 p.10)

With this schematic overview, O'Riordan proposes that communication enters after the risk evaluation phase, involving political judgments. He classifies the communication process under the risk control phase. He defines risk communication as the sharing of risk information from those who have that information to those who are presumed to be without it. Our evaluation of the model is again rather critical. We think that the model can be applied to calculable and transparent risks. For the new, more socially and medially constructed risks, the flows between the four phases are not unidirectional nor consequently succeeding each other. The viewpoint is rather top-down oriented, assuming that the public is a passive audience that is not directly involved. Again, we can apply the

main critiques that we formulated on the risk management model of the Working Group on Risk Assessment and Risk Management. Fortunately, O'Riordan has also described the process of risk communication more specifically in a comprehensive and schematic figure, that will be discussed in section 3.4.1 of this chapter.

We can conclude that communication is a vital element that has a functional nature throughout the entire risk assessment and risk management process. Naturally, the nature of the communication will vary according to its function, objectives, involved stakeholders etc.

The UK Cabinet Office has developed a framework that integrates both four steps in the risk management process as the role of communication flows (one-way bottom-up and top-down, two-way) during this process (GICS, p.25). The communication flows have a different purpose and focus during each of the four stages. We should bear in mind that this model is applied in the context of governmental risk communication.

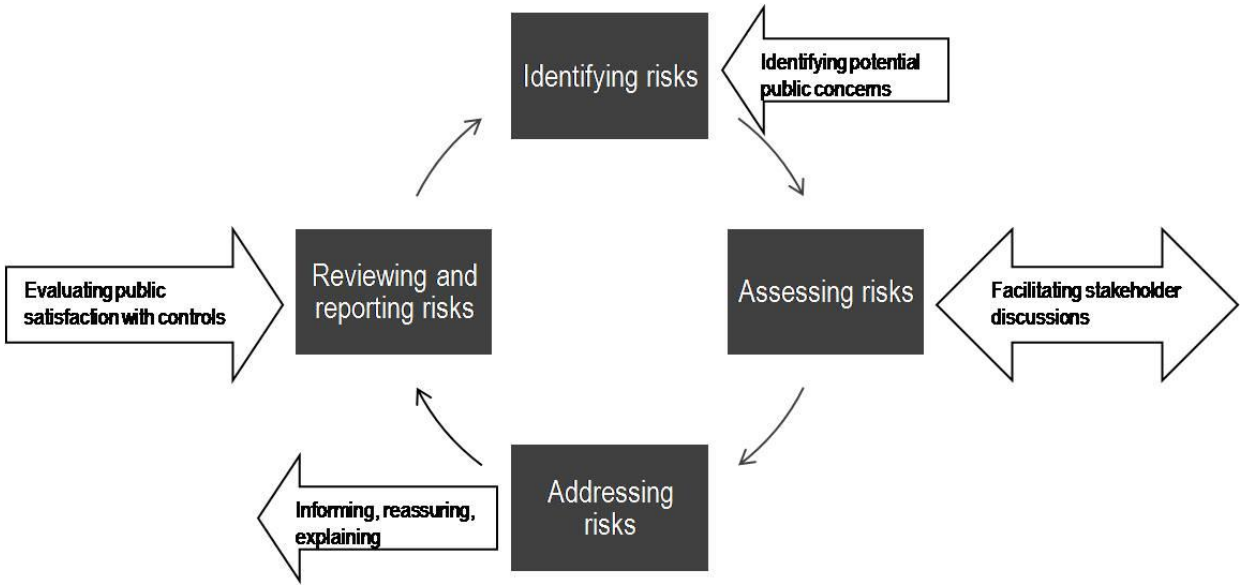


Figure 13: The risk management process as developed by the UK Resilience Center (GICS, p.25)

The model strongly emphasizes the function of bottom-up and interactive communication flows. Risk managers that developed the framework are convinced that understanding how people perceive risks is often as important as understanding the risk itself. That is why the information retrieval about the risk contexts with the specific sections of the population is considered as one of the most important information flows throughout the entire risk management process. The subjoined table specifies the stages of the risk management process and integrates the practical implications.

Stage	Practice
Stage 1 - Identifying risks	Public information retrieval about perceived potential risks and concernedness within specific sections ➔ Information retrieval from public (from various groups) ➔ Techniques: attitude surveys, focus groups, continuous stakeholder consultation
Stage 2 - Assessing risks	Cooperative strategy development (acceptability risks, actions needed for risk mitigation) ➔ Information exchange and brokering discussions between different stakeholders
Stage 3 - Addressing risks	Strategy implementation and info diffusing ➔ Information provision to the public about the various roles of the government : advisory role, protective role, redistributive role
Stage 4 – Reviewing and reporting risks	Risk management evaluation by public involvement in assessment process ➔ Information retrieval about risk management evaluation and risk control; similar techniques as in stage 1

Table 5: Four stages in risk management (GICS, p.25)

The risk management cycle is very similar to the previous overviews of risk management processes. It incorporates a risk identification, risk assessment, risk addressing and reviewing stage. The added value of the model can be appointed to the fact that risk communication and information flows play a very important role in all stages of the process. In the identification stage, information is retrieved with the public about perceived potential threats and people are interrogated about their specific concerns about risk issues. The strategy advocates active information retrieval and even proposes some concrete information gathering tools. In the risk assessment stage, strategies ideally are cooperatively developed, based on interactive information exchange processes between the various stakeholders. The specific implementation of the risk management strategy also involves information provision to the public. Risk communication is labeled as a very important factor for the successful implementation of the risk management strategies and the offered solutions. In the last stage, including reviewing and reporting, information will be retrieved with the public about the evaluation of the implemented strategy. We can consider this last stage as a crucial stage for retrieving feedback, which offers a valuable input for strategy optimalization. Again, communication between the main stakeholders will play a crucial role in this stage. The final aim of risk management strategies is to avoid crises or when crises do occur to minimize the consequences by stimulating preparedness both on the operational level as on the level of people management. People management naturally includes

preparing first responders but also preparing all possible stakeholders that may be affected by the crisis or contribute to the crisis management process. The nature and objectives of the communication flows vary strongly in both risk communication as crisis communication processes. In the next section, we will elaborate on the differences between crisis communication and risk communication and discuss their interrelationships.

2. Crisis communication versus risk communication management

2.1. The difference between crisis communication and risk communication

Risk communication can be considered as a part of crisis communication but crisis communication can also be considered as a basic element in risk communication strategies. Peter Sandman uses the last approach. He divides risk communication into three categories and indicates that crisis communication is one of them:

"When people are appropriately concerned about a serious hazard, the task is to help them bear it and to guide them through it. This is the true paradigm of crisis communication. In a crisis, people are genuinely endangered and rightly upset." (P. M. Sandman, 2006 p.257)

Reynolds and Seeger formulated a similar purpose of crisis communication. However, they focus on harm-reducing information diffusion to affected communities, which implies communication that has to occur in an actual or post-crisis situation.

"Crisis communication seeks to explain the specific event, identify likely consequences and outcomes, and provide specific harm-reducing information to affected communities in an honest, candid, prompt, accurate, and complete manner." (Reynolds & Seeger, 2005 p.46)

We will now try to point out the differences between the two concepts of risk and crisis communication. According to Sellnow et al. (2008), a first fundamental difference can be retrieved in their purpose: risk communication has to avoid crises, whereas crisis communication has the general target to provide operational information during a crisis situation in order to limit the negative consequences of that crisis. A second difference is that crisis communication has an immediate character and reacts very specifically on each specific crisis situation. Risk communication can be much more structured and controlled and it has a more general character because it is a situation that transcends the characteristic traits of a specific crisis communication. (Sellnow, Ulmer, Seeger, & Littlefield, 2008).

Risks are perceived potential threats that can physically and psychologically harm people in a direct or indirect way. Risk consists of two components: a physical, more tangible and quantifiable component and a mentally constructed component, or as some others stated: risk as a physical attribute and risk as a social construct (Bradbury, 1989; Rayner & Cantor,

1987). Depending on the type of risk, the share of each of the two components will vary. Within this lies the difference with 'crisis' as a concept: the share of the physical component is much larger in a crisis situation because the perception of risk, regardless of whether it has been confirmed or vitiated, has become reality. The role of the risk - and crisis communication processes can be defined differently: in crisis situations we can say that communication has an instrumental, coordinating role, where information has to reach the specific target groups through the most appropriate communication channels and in the most efficient way in order to meet the operational and psychosocial needs of people involved in a crisis situation. Risk communication focuses on the manipulation of perceptions of specific risks so that the eventual potential consequences of risks that have become crises may to a certain extent be controlled and guided in a specific direction, or as Littlefield et al. state: *"the ultimate goals of risk communication is to avoid crisis"* (Sellnow, Ulmer, Seeger, & Littlefield, 2009 p.4). Crisis communication on the other hand focuses on the communication during the crisis and in the post-crisis stage. The central focus is on containment, prevention of further expansion of the crisis and recovery from a crisis situation: dangerous event, avoided catastrophes etc. The focus is mainly on the physical component of the situation and less on the more abstract dimension of the situation.

Littlefield et al. used the overview table of Seeger et al. (2003) to point out the distinguishing features of risk and crisis communication (Sellnow et al., 2009 p.4). It integrates differences in the central object (risk versus crisis event), the nature of the message, the knowledge, the terms, the key players, the scope, the central media channels and the specific nature of the processes.

Risk Communication	Crisis communication
Risk centred: protection about some harm occurring at some future date	Event-centred: specific incident that has occurred and produced harm
Messages regarding known probabilities of negative consequences and how they may be reduced	Messages regarding current state or conditions: magnitude, immediacy, duration, control/remediation, cause, blame, consequences
Based on what is currently known	Based on what is known and what is not known
Long-term (pre-crisis stage) message preparation (i.e. campaigns)	Short term (crisis stage), less preparation (i.e. responsive)
Technical experts, scientists	Authority figure emergency managers, technical experts
Personal scope	Community or regional scope
Mediated: commercials, ads, brochures, pamphlets	Mediated: press conferences, press releases, speeches, websites
Controlled and structured	Spontaneous and reactive

Table 6: Distinguishing features of risk and crisis communication (Sellnow et al., 2008 p.4)

The principal differences lie within the execution phase of the risk and crisis communication strategies and more specifically within the message specificities. Where risk communications are more informative, have a long term preparation and even implementation stage, use other communication channels and can be managed and structured more accurately, crisis communication is more directive and reactive to the specific situation and can only limitedly be prepared beforehand, other official spokesmen are used (depending on the involvement of responsible authorities) and the media channels are mass media that can diffuse crucial information immediately and on large scale to a large and even entire population.
The table provides a nice overview of the key differences, but its starting point is the concept of risk in its most basic and transparent sense. The features that are presented in the column about risk communication are correct but limited to the concept of transparent and translucent risks as defined in the first chapter by Wilkins and Patterson. The concept of opaque risks, that are most interesting because of their high unpredictability, unfamiliar scenarios and causes because of their low probabilities and their low transparency (Wilkins & Patterson, 1990), are overlooked. That is why we will attempt to create a similar table, comparing both types of risk communication.

Opaque risk communication	**Transparent and translucent risk communication**
Risk centred: informing and explaining the risk and possible consequences	Risk centred: protection about some harm occurring at some future date
Messages regarding the nature of the risk, possible consequences and what is being done to prevent the risks	Messages regarding known probabilities of negative consequences and how they may be reduced
Based on what is known of similar risks, on what is not known	Based on what is currently known
Long-term message preparation and especially long term and continuous communication	Long-term (pre-crisis stage) message preparation (i.e. campaigns)
Experts, but taking into account the role of interpersonal communication and opinion leaders	Technical experts, scientists
Personal and communal scope, trespassing physical and geographical borders and introducing cyber communication	Personal scope
Mediated: primarily two-way interaction platforms (forums, web 2.0)	Mediated: commercials, ads, brochures, pamphlets
Semi-controlled and semi-structured as message creation and information diffusing lie both in the hands of the authorities as the public (opinion leaders)	Controlled and structured

Table 7: Distinguishing features of risk communication about opaque en transparent risks

Naturally, the features are not always that clearly distinguishable. The interactivity aspect is a feature that has to be implemented in all risk management and risk communication strategies. Other traits may also overlap, and so may the border between translucent and opaque risks. It is not always clear how a certain risk should be categorized. To conclude, we want to emphasize the interactivity aspect of risk communication as the most important disparity with crisis communication. The interactivity aspect in crisis communication has a purely operational nature: exchanging concrete information to reduce and avoid further harm. In risk communication strategies, the interactivity aspect has a long-term nature and is an essential building block for public-oriented risk communication strategies. The nature of the exchanged information in risk communication flows will probably have a more political and abstract nature. Crisis communication as we perceive it could be better labelled as disaster warning and emergency information.

2.2. Crisis communication in its purest sense: warnings and emergency information

Covello et al. categorized disaster warnings and emergency information as a type of risk communication (V. T. Covello, Von Winterfeldt, & Slovic, 1986). We defined a clear borderline between risk communication, crisis communication and pre-crisis communication or process risk information. The authors also describe a variety of problems and barriers that complicate the task of providing disaster warnings and emergency information.

- The macro objectives of government officials, such as minimizing loss of life and property damage, often conflict with the micro objectives of local residents who assign highest priority to protecting their own surroundings (property, possessions, friends, family members, etc.);
- Most emergency situations are accompanied by very sharp time pressures which do not allow communication experts to extract much time for the development of customized and specific communication efforts. That is why pre-development of customized communication strategies (including clearly defined messages, communication channels, time schedules, target group profiles…) is absolutely necessary;
- Communication coordination between the various stakeholders (authorities, emergency workers, industry) is often very difficult, resulting in general confusion about responsibilities and the establishment of multiple and competing communication flows by various sources;
- Communication channels also break down very often, that is why a very extended communication plan should be written;
- Warning systems are not infallible: false alarms can confuse people, create mistrust and desensitize people to future warnings;
- In case of a crisis or disaster, public response is often delayed by disbelief, reluctance, mistrust in the alarm system and denial. The communication efforts must capture public interest and attention immediately.

Crisis communicators can take into account the following recommendations when drafting crisis communication plans:

- The public must be provided with concrete and clear information and guidelines about specific actions that can be taken at the time of emergency.
- The coordination of crisis communication flows is probably the most important aspect of a solid crisis communication strategy. Official communications should happen through a single, reliable and highly credible spokesperson, which should be chosen based on the specific crisis situation traits. In this way, people will not be overloaded with contradictory information.
- One coherent and clear message is important, however this message can be diffused through various communication channels in order to avoid non information because of a channel failure.
- Establish possibilities for personal communication to come up to the information needs of the public: : hotlines, websites, forums, blogs, chat sessions with officials etc.
- Specific risk perceptions and fears should be identified so that specific communication provision can be established.
- Sometimes, local citizens or opinion leaders can be enlisted to communicate with their peers. The power of interpersonal communication in case of emergency is probably even stronger than the power of 'anonymous' sources and media.
- Pre-crisis communication (guidelines, where to find information, what to do, etc.) is of course one of the key success factors for an effective implementation of crisis management strategies during the event.

As mentioned before, some authors consider pre-crisis communication as risk communication. The next paragraph will discuss the CERC, a framework that integrates the information and communication flow from the pre-crisis to the post crisis stage.

2.2.1. The crisis and emergency risk communication model (CERC)

The crisis and emergency risk communication model is a framework that has been developed by Reynolds and Seeger and it is an effort to develop a comprehensive and integrated framework that integrates communication efforts from the pre-crisis risk communication to the post-crisis communication (Reynolds & Seeger, 2005). It claims to be integrative, so it tries to coordinate strategies of risk and crisis communication. The authors state that their model meets the needs to be 'strategic, broad based, responsive and highly contingent' (Reynolds & Seeger, 2005 p.49). The model is based on an extensive review of crisis planning and risk communication literature on the one hand and on practical experiences and research conducted by the Centre for Disease Control (CDC) on the other hand. Its inclusive nature allows the model to be applied in various risk contexts where public safety is involved.

The model strongly emphasizes the function of risk communication as an element in the crisis communication process. The traditional risk communication practices that are advised

to be implemented in the pre-crisis stage involve educating the public about risks and appropriate responses to avoid risks such as changing attitudes and behaviours so that risks can be reduced. This perspective is again a linear one-way top-down perspective on risk communication as they presuppose that the public is a passive audience that needs to be informed and even educated about certain risk situations. There is no room for interactivity. We only notice the remark that in the first stage, messages should be constructed and tested in order to optimize them. We do not find any referral to the active involvement of the audience nor an invitation for active participation in the risk debate of the general public, or any other specific target groups. That is why we do not label this tool as being an audience-centered framework for risk communication. It could be a very useful tool to be used in crisis communication and risk communication in the context of risks that may eventually emerge in a crisis.

I. Pre-crisis (Risk Messages; Warnings; Preparations)

Communication and education campaigns targeted to both the public and the response community to facilitate:

- Monitoring and recognition of emerging risks
- General public understanding of risk
- Public preparation for the possibility of an adverse event
- Changes in behaviour to reduce the likelihood of harm (self-efficacy)
- Specific warning messages regarding some eminent threat
- Alliances and cooperation with agencies, organizations, and groups
- Development of consensual recommendations by experts and first responders
- Message development and testing for subsequent stages

II. Initial Event (Uncertainty Reduction; Self-efficacy; Reassurance)

Rapid communication to the general public and to affected groups seeking to establish:

- Empathy, reassurance, and reduction in emotional turmoil
- Designated crisis=agency spokespersons and formal channels and methods of communication
- General and broad-based understanding of the crisis circumstances, consequences, and anticipated outcomes based on available information
- Reduction of crisis-related uncertainty
- Specific understanding of emergency management and medical community responses
- Understanding of self-efficacy and personal response activities (how and where to get more information)

III. Maintenance (Ongoing Uncertainty Reduction; Self-efficacy; Reassurance)

Communication to the general public and to affected groups seeking to facilitate:

- More accurate public understandings of ongoing risks
- Understanding of background factors and issues
- Broad-based support and cooperation with response and recovery efforts
- Feedback from affected publics and correction of any misunderstandings and rumors
- Ongoing explanation and reiteration of self-efficacy and personal response activities (how=where to get more information) begun in Stage II.
- Informed decision making by the public based on understanding of risks and benefits

IV. Resolution (Updates Regarding Resolution; Discussions about Cause and New Risks/New Understandings)

Public communication and campaigns directed toward the general public and affected groups seeking to:

- Inform and persuade about ongoing clean-up, remediation, recovery, and rebuilding efforts
- Facilitate broad-based, honest, and open discussion and resolution of issues regarding cause, blame, responsibility, and adequacy of response.
- Improve/create public understanding of new risks and new understandings of risk as well as new risk avoidance behaviours and response procedures
- Promote the activities and capabilities of agencies and organizations to reinforce positive corporate identity and image

V. Evaluation (Discussions of Adequacy of Response; Consensus About Lessons and New Understandings)

Communication directed toward agencies and the response community to:

- Evaluate and assess responses, including communication effectiveness
- Document, formalize, and communicate lessons learned
- Determine specific actions to improve crisis communication and crisis response capability
- Create linkages to pre-crisis activities (Stage I)

Table 8: Crisis and emergency risk communication model (Sellnow et al., 2008 p.171)

2.2.2. The general risk and crisis management model

Based on the differences between risk and crisis communication and the idea of risk communication as a kind of pre-crisis communication, we developed the following conceptual model.

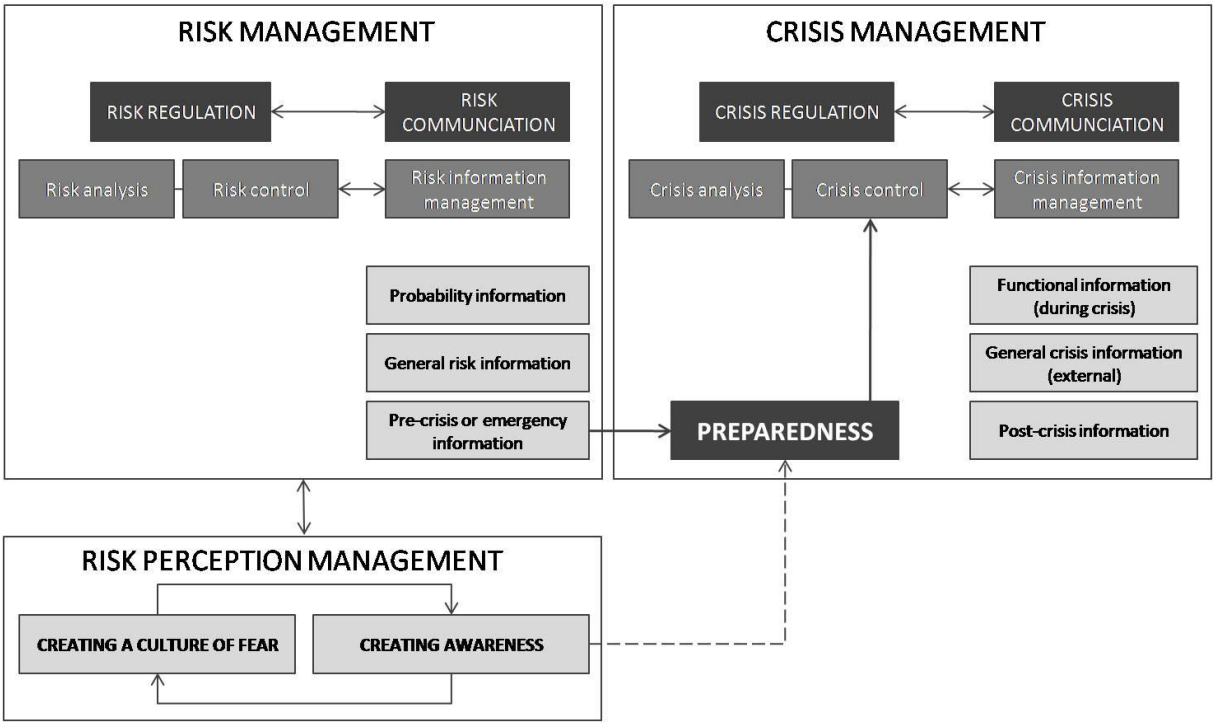


Figure 14: The general risk and crisis management model

The model integrates both the similarities as the differences between risk and crisis management and the nature of the risk information that is involved in the information management processes. Both risk as crisis management have a regulation and a communication dimension. Communication has previously been defined as a lubricant throughout the entire risk management process, so we cannot separate communication from regulation. The two processes do not stand next to each other, but they interrelate. The risk and crisis regulation components involve risk analysis and crisis analysis. This phase involves the analysis of the information and data that is available. The second component of risk/crisis regulation is risk/crisis control, where strategies to deal with the specific risk or crisis are constructed and implemented. So the risk and crisis regulation phases are structurally quite similar, but content wise they can differ very strongly because of the differences in the nature of risks and crises. Also the available resources in terms of time and materials are different. Besides risk regulation, the risk information management stages in risk and crisis communication look similar at first glance. In crisis information management, the main ingredients are functional information (how, who, what, where, etc.), general crisis information (mainly external communication to press and other stakeholders) and post-crisis

communication. Risk information management is less obvious because the risk situation is often very uncertain and untransparent. Naturally, information diffusion about probabilities is one option. But since there are many uncertain and opaque risks, for which no concrete probability information is available, it is often not possible to communicate concrete facts and figures or other functional information. The second type of risk information is general risk information, about possible causes and consequences, who is responsible etc. The last type of information is actually pre-crisis or pre-emergency information. This type of information involves concrete guidelines about what to do when the risk turns into a crisis (emergency services, practical guidelines, crisis centre information, etc.). Pre-crisis information is of course the most useful in terms of increasing the general preparedness of a community and it can deliver a great contribution in the crisis control process. But again, not all risks can be predicted in terms of their consequences or how to avoid them by taking specific safety measurements. Some risks are too vague and uncertain to be anticipated. Within this lies the main problem with risk communication: how should the information management strategy look like when authorities are confronted with these new, uncertain and unpredictable risks and how can communities efficiently be informed to increase their preparedness. We could state that the risk management process can be extended with a risk perception management dimension. Risk perceptions are mainly individually and socially constructed. Chapter four will elucidate the main frameworks within this field of interest. Is risk perception actually linked to risk control in the sense that, when we can control the communal perceptions of the risk, we can control the triggers or consequences? We can state that risk perception management involves intensive risk information exchanges between the various stakeholders. It is a very complex process since the balance between creating awareness and inducing a culture of fear is very fragile, especially when authorities are confronted with uncertain threats of which not much information is available. We can conclude this section by stating that efficient risk communication can be an important link to preparedness and crisis communication. It is beneficiary in terms of the reduction of side effects such as fear, panic, chaos and the costs that are related to the crisis management process. The general mental and physical preparedness of both individuals as the community can function as a buffer for the diverse negative implications and social reactions of the crisis. Policymakers and crisis managers can take advantage from accurate and efficient risk and crisis communication management by taking into account all possible and known factors and preparing themselves and the community for as many negative factors that can influence the whole crisis management process. This doctoral dissertation will mainly focus on the process of the more complex and abstract process of risk communication.

3. Risk communication

3.1. Informing people about risk

As Slovic et al. (1981) stated in their article "Perceived Risk: Psychological Factors and Social Implications" people cultivate a growing awareness of risks that are present but not always visible in their near environments as they are confronted with increasing amounts of information about these risks through various media channels. This growing awareness induces an increasing pressure on hazard producers and regulators, such as the governments to inform people about the risks they face (Slovic et al., 1981). As these authors state, and the idea is supported by policy makers and communication experts, creating effective risk communication programs is a very complex and difficult assignment:

"Doing an adequate job means finding cogent ways of presenting complex technical material that is clouded by uncertainty and may be distorted by the listeners' preconceptions (and perhaps misconceptions) about the hazard and its consequences" (Slovic et al., 1981 p.29).

The authors also express the need for extensive empirical research on the problems of risk communication since the perceptual space surrounding risks, and especially unknown or untransparent risks, can easily be influenced by both the information sender as the receiver.
Besides the need for academic input, both in terms of empirical as theoretical and conceptual contributions, Slovic et al. also pose some very essential questions, that, in our point of view, touch the fundamental principle of good risk communication practices: democracy and public participation.
"What kind of political institutions are needed to preserve democratic freedoms and ensure public participation for problems involving technical complexity, catastrophic risks and great uncertainty? If public debates and communications from experts do little to allay fears and, indeed, may exacerbate them, how should we structure public participation?"
(Slovic et al., 1981 p.33)

Risk communication is a very complex and abstract concept since it can be approached by several viewpoints. Therefore, it is very important to define the concept accurately and as unambiguously as possible.

3.2. Defining risk communication

The importance of risk communication is not limited to the discipline of communication sciences. It is a multidisciplinary practice that has found entrance in various academic and applied orientations such as actuarial approaches utilizing statistical predictions, toxological and epidemiological approaches, an engineering approach including probabilistic risk assessments, and cultural and social theories of risk (Renn, 1992b), political sciences etc.

Heath et al. stated that the risk communication discipline is a reconciliation of risk perception and risk management studies (R. L. Heath & Palenchar, 2000 p.134). Within the broader field of general risk research, we can also identify several institutes that mainly focus on risk communication. Two pioneer centers are the Center for Risk Communication[1], founded by Vincent Covello and the Environmental Communication Research Program[2] (later Center for Environmental Communication), founded by Peter Sandman. Also general risk research institutes such as the Society for Risk Analysis (SRA)[3] and the European Safety and Reliability Association (ESREL)[4] established specialty groups about risk communication practices that have gained increasingly more interest and attracted more members with various backgrounds over the past years. As the Risk Communication Specialty Group of SRA stated themselves: *"Members' interest areas include the perception of risk, public participation, mass media coverage of risk, trust and credibility, social influence, and evaluation related to risk communication activities."(*www.sra.org*)*

Renn mentions three separate research traditions in which risk communication plays a central role: scientific positivism, constructivism and the dialogue perspective. Most risk communication definitions can be classified in one of these three traditions (Renn, 1992b).

Scientific positivism uses data and methodologies of scientists to dominate community efforts to ascertain the degree of risk and subsequent communications about the risk on behalf of the community.

Hampel states: "*(Risk) Communication means to inform the public about the risk as it was defined by scientists"* (Hampel, 2006 p.8). Hampel uses the definition of risk communication in the authentic scientific positivism tradition. In this view, the public is assigned a passive role.

Constructivism/relativism uses the power of collective opinion creation. We will base ourselves partly on this perspective as one of our main focuses lies within the social and medial construction of risks.

The **dialogue perspective** integrates scientific and academic opinions in public policies (collaborative decision-making). Fearn-Banks defines risk communication in this tradition as follows:

"an ongoing program of informing, and educating various publics (usually external publics) about issues that can affect, negatively or positively, an organization's success. The program

[1] The Center for Risk Communication was raised in 1998 by Cincent T. Covello. The Center claims to be "a pioneer in the development and use of advanced communication methods based on decades of university-level behavioural-science research and practice. Research and experience clearly prove that one of the most important keys to communication success is an organization's ability to establish, maintain, and increase trust and credibility with key stakeholders, including employees, regulatory agencies, citizen groups, the public and the media.". www.centerforriskcommunication.com.

[2]Peter Sandman founded the Environmental Communication Research Program (ECRP) at Rutgers University (USA) in 1986, and was its director until 1992. The center's name was changed into Center for Environmental Communication.

[3] The Society for Risk Analysis is a multidisciplinary, interdisciplinary, scholarly, international society that unites various stakeholders that are involved in risk analysis which is broadly defined to include risk assessment, risk characterization, risk communication, risk management, and policy relating to risk, in the context of risks of concern to individuals, to public and private sector organizations, and to society at a local, regional, national, or global level. www.sra.org

[4] ESREL is concerned with the problems of creation and assurance of safety and reliability in the human-technology-environment interactions. Their activities (conferences etc.) cover safety, reliability and risk-based methods as well as their application in a wide range of industrial and governmental sectors.

builds solid relationships between an organization and its key publics, the publics on which an organization's survival depends. These relationships must be established prior to a crisis. It is too late after a crisis erupts" (Fearn-Banks, 2007 p.58).

Covello et al. (1986) also defined risk communication in the dialogue perspective. They state that risk communication is *"any purposeful exchange of information between interested parties about levels of health or environmental risks, the significance or meaning of health or environmental risks or decisions, action or policies aimed at managing or controlling health or environmental risks."* (V. T. Covello et al., 1986 p.172)

Leiss also focuses on the two-way information flow and defines risk communication as *"the flow of information and risk evaluations back and forth between academic experts, regulatory practitioners, interest groups, and the general public"* (Leiss, 1996 p.86). He also mentions that disagreements over approaches, principles, decisions about risk information disclosures between the various constituencies and stakeholders may strongly influence the risk management process. This is mostly due to a failure to carefully consider each other's position. This statement illustrates the nature of the dialogue perspective on risk communication.

Also Sellnow et al. (2009) have stressed that the public information model of communication that stresses the one-way dissemination of information is a linear view that fails to solicit public feedback and even refers to a potential for abuse or discrimination. (Sellnow et al., 2009).

It was the National Research Council (NRC) that stressed in their report "Risk Assessment in the Federal Government: Managing the Process" the importance of risk communication as a vital element in the risk assessment and management process. They also published one of the basic books on risk communication: "Improving Risk Communication" (N.R.C., 1989). The N.R.C provided us with one of the basic definitions of risk communication that integrated the 'democratic dialogue' concept (Sellnow et al., 2009 p.5):

"Risk communication is an interactive process of exchange of information and opinion among individuals, groups and institutions. It involves multiple messages about the nature of the risk and other messages, not strictly about risk, that express concerns, opinions or reactions on risk messages or to legal or institutional arrangements for risk management. (N.R.C., 1989 p.21)

This definition reflects the involvement of the risk perceptions of diverse actors, receivers and senders, who are involved in the communication process. Policy makers can integrate the information gained from the perceptions and needs of different stakeholders into their crisis-and disaster management and crisis communication strategies. By mapping the various public risk perceptions, risk - and crisis managers will be able to create in tune risk and crisis communication strategies that deliver target based messages to specific audiences. As we will discover further in this chapter it is very important to create customized messages through the most appropriate channels. This will increase the perceived information reliability and source credibility. Risk communication involves more than just creating and sending press releases, organizing press conferences or launching public campaigns, it is

about gaining trust, changing or inducing attitudes and behaviours and stimulating the public willingness to react and help each other and following the crisis guidelines in times of crisis.
We will use risk communication definitions in the tradition of the dialogue perspective as a starting point for this PhD.

3.3. Goals of risk communication

As mentioned in the introduction, risk communication has different goals varying from general provision of information about risks to influencing behaviour and increasing awareness and preparedness. Several authors (Aakko, 2004; Renn & Levine, 1991; K. E. Rowan, 1991), have formulated various functions of risk communication. Risk communication can fulfill the following aims:

- to improve risk understanding among target groups and to educate: **the enlightenment role**;
- to inform or disclose information to people who may be exposed to certain risks: coming up to the **right-to-know** about certain risks;
- to legitimize risk management decision, to enhance the acceptance of a certain risk source: **attitude modification role**;
- to reach agreements, motivate actions and to explain and legitimize general risk management decisions and routines for the enhancement of trust in the competence of the risk management processes and the risk regulators: **legitimating role**;
- to enhance public protection through the provision of information regarding individual risk reduction measures: **risk reduction role**;
- to raise awareness;
- to encourage protective behaviour or to induce supportive behaviour towards the risk regulators and communicators: **behavioural change role**. This role is also the main starting point for the goal-oriented definition of risk communication by Sandman et al.: *"risk communication to mobilize people"* (P. M. Sandman, Weinstein, & Klotz, 1987 p.93);
- to reduce uncertainty (Wardman, 2008).

The multiplicity of risk communication purposes and measures of success makes the process of needs assessment centrally important before actually undertaking a risk communication effort (Bier, 2001). That is why we will spend a great deal of attention to the identification of risk information needs in order to develop coherent and specific risk communication strategies.
A lot of experts consider risk communication as an interactive process of opinion- and information exchange that takes part between individuals, groups and institutions. Covello (1986) formulates the objectives of risk communication as follows: providing information and education, specific and preventive behavioural changes of all stakeholders, warning and informing about disasters and emergency situations but most of all, constructing collective problem solving and conflict handling strategies. Covello et al. also proposed a typology of

risk communication tasks in terms of their objectives or intended effect (V. T. Covello et al., 1986). We summarized the typology in the subjoined scheme.

Typology of Risk Communication Objectives	
Type I **Information and Education**	Informing and educating the public about risks and risk assessment in general ⇨ **nondirective** activity (oneway)
Type II **Behaviour Change and Protective Action**	Encouraging personal risk reduction behaviour (motivating to pursue behavioural actions) ⇨ **directive** activity (oneway)
Type III **Disaster Warnings and Emergency Information**	Providing direction and behavioural guidance in disasters and emergencies ⇨ **directive** activity (oneway)
Type IV **Joint Problem Solving and Conflict Resolution**	Involving the public in risk management decision making and in resolving health, safety and environmental controversies ⇨ **cooperative** action (two-way)

Table 9: Typology of risk communication objectives (V. T. Covello et al., 1986)

The first three types of risk communication objectives are strongly linked to the concept of risk communication as pre-crisis communication. Type II, behaviour change and protective action, and type III, disaster warning and emergency information are objectives that contribute to pre-crisis management strategies. This type of pre-crisis information diffusion will have the objective to increase individual and communal preparedness and mental resilience. High preparedness, even when it is primarily a perceived preparedness by increasing mental resilience, will contribute to effective and efficient crisis control management. Type IV, joint problem solving and conflict resolution, has a cooperative nature and includes a two-way communication flow. This type of risk communication may contribute to crisis management when it occurs during the crisis. But we suppose it is actually meant to take place in pre-crisis stages. Besides the risk management decision making processes in the context of known risks, it will also be applied in decision making processes about unknown and opaque risks. Since these kinds of risks are primarily characterized by a low level of knowledge about the risk as such and its consequences, the perceptions and responses of the public to these types of risks are key issues as both perceptions and responses will largely determine behavioural intentions and concrete behaviour. That is why the input of all stakeholders involved with 'new' risks is crucial in the risk management, policy construction and decision making processes.

Type I is also involved in pre-crisis type of communication strategy when the objective is to educate and inform the people about what to do in the crisis situation and how to deal with the risk. On the other hand, it is also important to inform people about transparent and

untransparent risks in the context of risk perception management, again with the final aim to increase the perceived preparedness levels and resilience. The concept of resilience is of significant importance to the dynamics involved with public responsiveness on sudden and unexpected events. Resilience can prevent collective psychosis of panic or fear. When confronted with fear or panic, the need for accurate information about the hazard is crucial to the individual since it is the only way to predict his own probabilities of involvement or exposure. Uncertainty can be reduced by acquiring the personally desired information. In this way, the individual will have the feeling that he is in control of the situation. When people are confronted with uncertainty in risk situations, and there is no or bad communication from familiar and trusted institutes such as the governments or the media, it will be very hard for them to cope with the perceived threat and the emotions it induces. This will influence behavioural intentions or concrete behaviour. The importance of communication when a community is being confronted (through the media or other sources) with an uncertain and untransparent risk should not be underestimated.
The following section will present some risk communication models that have been developed over the last couple of decades.

3.4. Risk communication models

Several models have been developed for risk communication processes. We will commence with the model of risk communication as developed by O'Riordan, as mentioned by Handmer et al. (Handmer & Penning-Rowsell, 1990 p.10)

3.4.1. O'Riordan's risk communication model

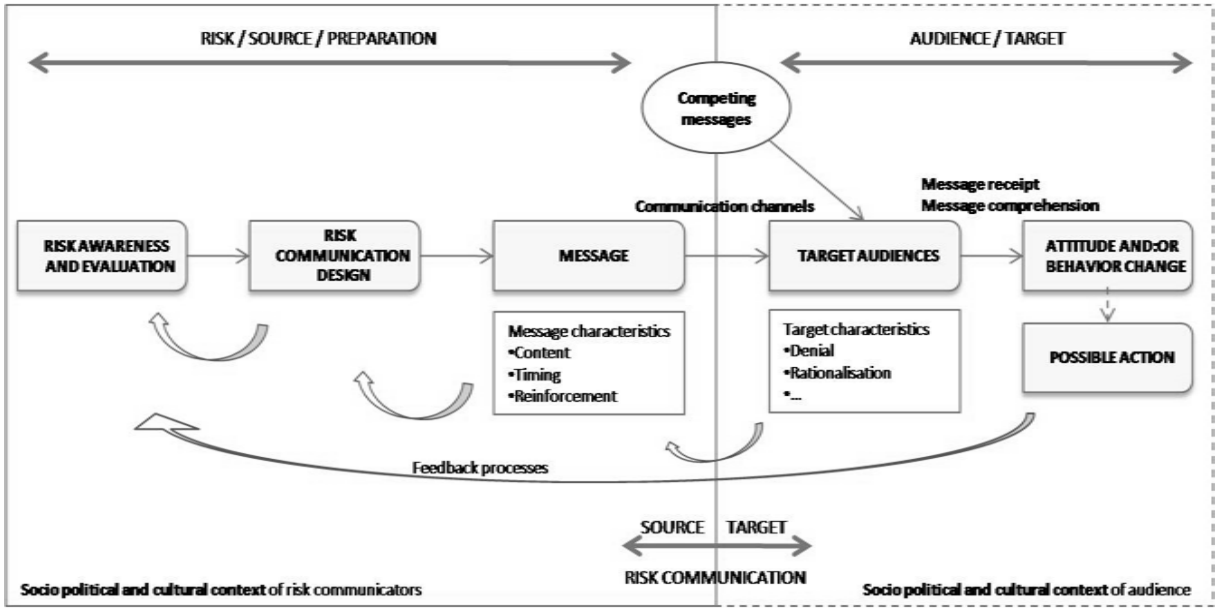


Figure 15: O'Riordan's risk communication model, used by Handmer and Penning-Rowsell (1990, p.10)

The starting point of this model is risk awareness and evaluation. These phases serve as an input for the design of a risk communication program. The (implicit or explicit) design process involves the construction of an objectively oriented message, the integration of a communication medium and a mode of delivery. Besides the objective information and the rather mechanical application of rules, it is also very important to take into account judgments of ethical, legal, political and economical issues. He puts special emphasis on the definition and identification of the specific profiles and needs of the target groups so that messages can be tailored to their needs. His attention for the audience as vital elements in the success of risk communication efforts will strengthen our vision and framework of a public oriented risk communication strategy. Subsequent to the message receipt, complex processes of information comprehension and filtering will influence a possible attitudinal change, behavioural intentions or even induce concrete behaviour, e.g. information seeking behaviour, protective behaviour etc.

One of the constructive aspects of the model is that it incorporates elements that are vital to the risk communication process from both the micro as the macro level. Besides focusing on the psychology of individual information processing, the model takes into account the fact that risk perception and risk management takes place within a social, political and economical context. Naturally, O'Riordan also integrated the potential for error and misunderstanding, but also for communication improvement and feedback on the various levels of the model. The feedback process will induce a continuous cycle of improvement and adjustment of the risk communication design. However, the model solely incorporates the possibility of feedback as an interactive element in the entire process, while other models in the dialogue perspective would incorporate the active involvement of certain stakeholders from the beginning of the process. Specific target groups may be involved in the process from the stage of risk awareness and evaluation and especially in the phase where risk communication strategies are designed. We would incorporate this public involvement conceptually from the first phase on.

The next three models describe the nature of the risk communication process (Leiss, 1989b). We will now discuss the information flow or institutional model, the message transmission model and the communications processes model.

3.4.2. The information flow model

The information flow model focuses on the risk information flow among the main institutional actors that are involved in the risk information flows: the media, agencies, independent researchers, the industries and other interested parties or the general public.

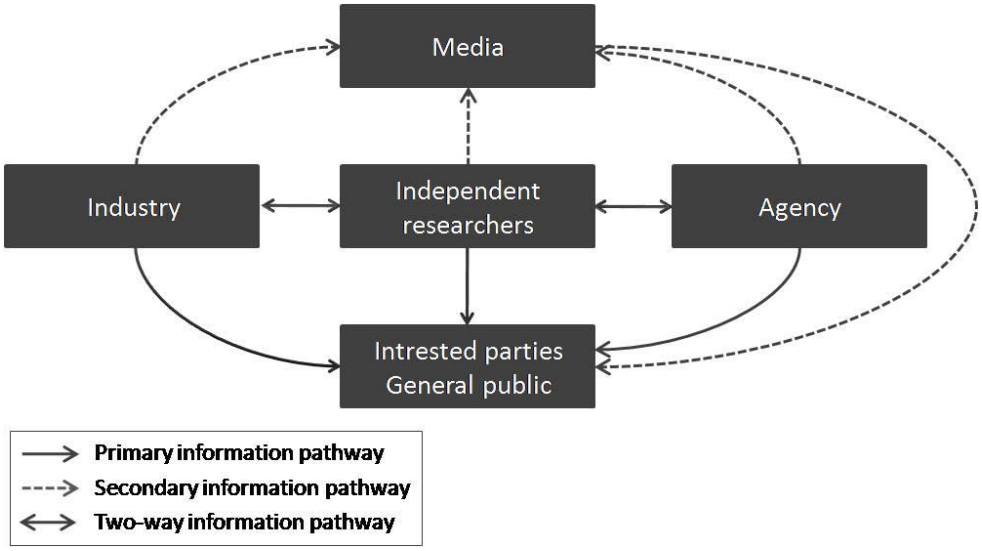


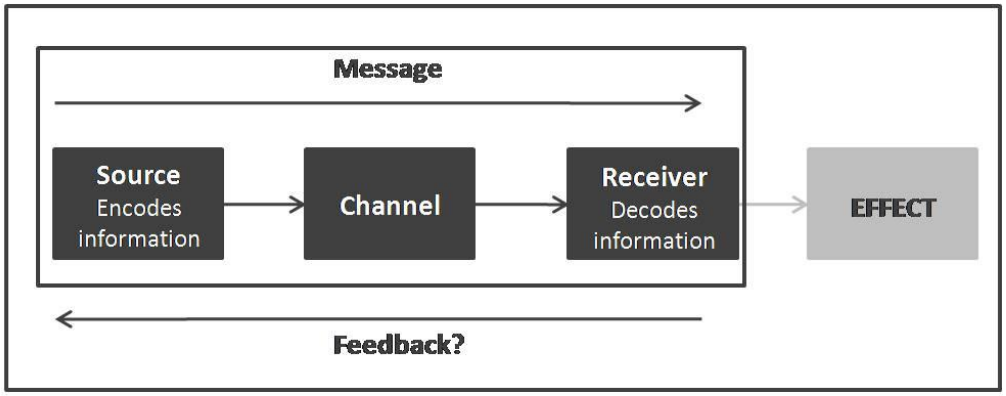
Figure 16: The information flow model of risk communication (Leiss, 1989b p.95)

The roots of this model lie within a legal framework in which responsibilities and liability can be assigned to the institutional and individual actors, on the basis of the risk information which they transmit to each other (Baram, 1984, 1986; Leiss, 1989b). The model has several limitations:

- It can only be effective when there is a possibility and potential to stimulate an adequate level of information flow through frequent resort to legal action.
- The media are represented by simplistic transmission mechanisms. Instead, we have already mentioned that the media are active players in the risk communication process, not only in the transmission process, but in the content creation process as well. Some additional arrows should be integrated as well: one from the public to the media as the public is gradually more involved in the creation of the media contents, not only by mass media but also by personal message transmission media (e.g. internet, forums, etc.).
- The interested parties and general public is represented as a passive, receptive audience. As mentioned in point two, the public may also deliver valuable risk information that can be integrated in the risk information flows. The model fails by neglecting the importance of public risk perception and the need for participative risk decision making processes in which the public plays an essential role.

3.4.3. The message transmission model

Covello et al. used this model for a comprehensive review of risk communication and formulated the four basic dimensions in which risk communication problems may arise (T. C. Covello, 1987a, 1989a; V. T. Covello et al., 1986). However, we added two additional elements that make part of the Basic Communication Model of Laswell: the possibility of an effect on the receiver and of feedback that introduces a two-way nature of the risk communication (Wood, 1983 p.12).



Message transmission model of risk communication by Covello et al.
Laswell's general communication model

Figure 17: Message transmission model combined with Laswell's general communication model

- The most important critical comment on the original message transmission model of Covello et al. is that the model portrays the risk communication process as a one-way transmission process (Leiss, 1989b). By adding the additional dimensions, extracted from Laswell's basic model of communication, we have added a new dimension of a two-way flow in order to come up to this remark.
- Another remark is the reduced role of the media. The media are categorized under the 'channel' block, which initially refers only to the basic, technological channel that transmits the message from sender to receiver. We would suggest to split the 'media ' concept into two entities: the media as information transmitters (technological and tangible nature) and the media as content creators and independent actors in social communication processes.
- The last remark includes the fact that Covello did not take into account the possible gap between the encoded information, which is the basis of the message created by the source, and the decoded information which includes the information that is processed in a certain way and integrated into the mental map of the receiver. The gap between encoded en decoded information is reflected in the gap between the original risk information message, offering neutral information about a risk setting, and the received risk information, which is retrieved, processed and integrated in the mental maps and the risk perceptions of the receivers. One encoded information block may be decoded in as many ways as there are individuals receiving the risk message.

3.4.4. The Communications Processes Model

The Communications Processes Model incorporates the most important elements of the previous two models and adds some additional concepts (Leiss, 1989b). The model reflects the interplay between the technical and the perceived risk, both can be allocated to an 'expert' sphere and a 'public' sphere (Davies et al., 1987b).

On the expert side, risk assessment and risk management has a strong technical and probabilistic nature, using highly sophisticated analytical tools and methods. It requires a lot

of technical expertise, which is also reflected in the general language that is used to communicate information.
On the public sphere side, the main focus is on the construction of the public risk perceptions. The eventual outcome in terms of societal risk perception should be factored into risk management decision making processes to increase public acceptance of risk policy decisions and to increase the social trust in the regulatory institutions.

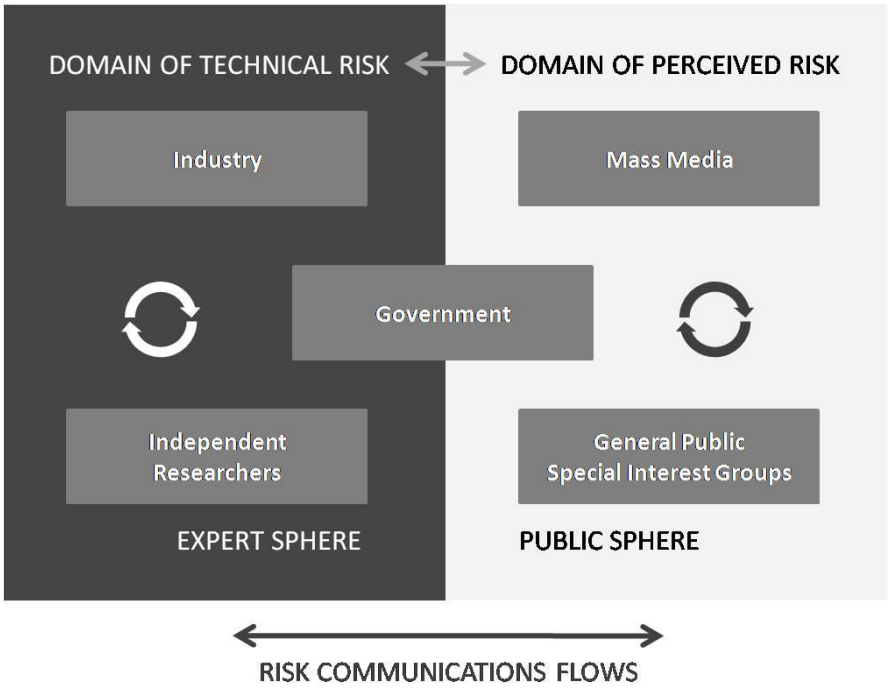


Figure 18: The communication processes model of risk communication (Leiss, 1989b p.100)

The five actors of Baram's information flow model (as discussed in 3.4.2) are placed in the area of expert sphere on the one hand (industry and independent researchers) and in the public sphere on the other hand (mass media and general public or special interest groups) according to the language they use to communicate about the risk contexts. The governmental institutes however are located in the middle as they can be compared with a bridge between the two spheres, they have to speak both languages and they have to pass trough information from one side to another. There are two information flows: one between the context of the technical risk and the public's perceived risk and another one within each sphere. This model acknowledges the possible obstacles that may arise in the process of risk communication as put in the forefront by Covello (1987) in the message transmission model of risk communication. However, on top of the four main categories (source, message, channel and receiver related problems) this model adds the potential problems that may arise when the boundaries between the expert sphere and the public sphere are crossed. Leiss (1989) includes conflicting or deviating risk messages because of the different nature of the languages and mindsets that are used in the specific spheres. We also want to relate the encoding-decoding principle that we added at the message transmission model as well. Sources from the expert sphere may encode information into a certain message, whereas

this message may be decoded differently by the receivers in the public sphere. These tensions between the domains of technical and perceived risk are also reflected in the modes in which the information is encoded and decoded: technical sources will use rather technical and rational approaches to the risk information (both in assessing as in communicating information) and the public will base themselves on a rather experiential mental mode to process risk information. The gap between the 'instinctive' experiential system and the 'new, industrialized' rational system could be proposed as an explanation for the differing risk information processing and diffusion processes of the public and the experts (Loewenstein, Weber, Hsee, & Welch, 2001; Paul Slovic et al., 2004). We will elaborate more on the general risk information processing mechanisms from a cognitive point of view in chapter four (2). We will however describe four specific risk information processing models in the following paragraphs.

3.5. Specific risk information processing models

Covello elaborates on three more models that describe how risk information is processed, how risk perceptions are formed and how risk decisions are made (T. C. Covello, 1998a; V. Covello & Sandman, 2001a; V. T. Covello, Peters, Wojtecki, & Hyde, 2001b), more specifically in high-concern risk situations.

3.5.1. The mental noise model

This model stresses the information processing mechanisms of people under stress and how these changes in information processing affect their communication. When people become aware of a certain hazard that threats their personal environment and valuable possessions, they will be in a higher state of concern. This will eventually lead to a less effective and efficient ability to process risk information, related to the specific threat, (Baron, Hershey, & Kunreuther, 2000; N.R.C., 1989). However, the aroused state that people are in is often accompanied by strong emotions such as fear and anger. This emotional arousal and mental agitation can create 'mental noise'. If people are exposed to risks that have negative psychological traits (e.g. risks that include some outrage factors that induce higher risk perception, such as involuntary, uncontrollable and unfair risks), there may arise some severe mental noise (Maslow, 1987; Neuwirth, Dunwoody, & Griffin, 2000) that will bias rational risk information processing.

3.5.2. The negative dominance model

Some outrage factors are closely related to the negative dominance model. This model describes the mental processing of positive and negative information in high-concern situations (V. T. Covello et al., 2001b). There is a general conflicting relationship between negative and positive information. Negative information generally gets a significantly larger weight in the processing of risk information. Maslow developed the theorem that people put

greater value on negative outcomes than on positive outcomes. Negative information has substantially greater impact than positive information in high-concern situations. The practical implications of this theoretical finding are that negative messages should be offered together with a substantial amount of positive or solution-oriented messages (T. C. Covello, 1998a; V. T. Covello et al., 2001b). A second remark is that non-verbal cues are interpreted negatively, so risk communicators should try to avoid non-verbal cues that may have strong potential negative connotations. Governmental risk communication efforts towards several stakeholders should be carefully planned and executed in order to create a positive image, with trust and a positive public attitude towards the government as basic building blocks. In general, risk communication will be more effective when the positive and problem-solving characteristics are stressed.

3.5.3. The trust determination theory

Continuing on the previous paragraph which mentions trust as a vital building block for successful risk communication, the trust determination theory also proclaims that proactive handling is essential in establishing trust. Trust is a necessary condition for the success of several risk communication objectives, such as education, information sharing, increasing preparedness and awareness, etc. (T. C. Covello, 1998a; V. Covello & Sandman, 2001a; Earle, 2009; Earle & Siegrist, 2008; Jan Gutteling, Hanssen, van der Veer, & Seydel, 2006; R. Peters, Covello, & McCallum, 1997a; M. Siegrist, 2008). Chapter three will extensively discuss the concepts of trust and credibility in governmental risk communication. However, we would already like to lift a tip of the veil. Covello mentions the principle of credibility transference (T. C. Covello, 1998a). This theorem pones that lower credibility sources take on the credibility of the highest credible source that agrees with its position on a (risk) issue. Surveys, mentioned by Covello, have indicated several organizations and individuals that have relatively medium to high credibility on various risk issues: health professionals, (doctors, pharmacists, …), educators, professional scientific and engineering organizations, non-management employees, non-profit organizations, environmental activist groups (often citizens), the media and local citizens who are respected, neutral and informed. We would like to stress the latter two groups: the media and the local citizens with specific traits that allow us to label them as ‘opinion leaders’.

The first remark we want to make relates to the media. ‘The media’ is a label that contains many mass media such as television, radio, but also internet. The internet creates possibilities and interaction platforms that allow interpersonal communication as well as communication to larger groups. Just think about the various forums, blogs, facebook, etc. that allow people to create contents and disperse this content to many users.

The second remark is with regard to these individuals that are respected, neutral and informed. These characteristics are some of the traits that we allocate to opinion leaders, which we will describe in detail in chapter four (3.7). We will put great emphasis on the importance of interpersonal communication and the effect of opinion leaders in the social construction of communal risk perceptions. The fact that Covello also indicates these

individuals as credible sources of information that may increase general trust and credibility is a confirmation of our opinion leadership concept.
In the end, a good coordination, collaboration and two-way dialogue between all of these important groups, that include both organizations as individuals, will substantially deliver contributions to the enhancement of trust and credibility throughout all stages of the risk communication process.

3.6. Stages in the risk communication process

The Carnegie Mellon approach to develop effective and creative risk communication strategies includes three steps (Slavin, Tucker, & Ferson, 2008). The first step is the creation of an expert model. The second step is the definition and characterization of the target groups of the risk communication efforts, especially in terms of the mental models concerning the risk perception that are at play. The last step is the creation and implementation of the communication output, the communication material that will have to influence risk perceptions and provide normatively accurate information (Slavin et al., 2008). Naturally, this three step approach is a conceptual strategy. It is necessary to construct a more specific and detailed overview of the risk communication process in order to make it more practically implementable.
The UK Resilience Center has integrated a very specific toolkit for creating risk communication strategies (GICS). The seven steps are formulated very explicitly in the document and will be discussed in the subsequent paragraphs. The strategic toolkit is primarily meant for risk (communication) managers that need to construct governmental risk communication strategies. Our primary objective of this PhD is to create a tool for governmental public-oriented risk communication strategies. This is the reasons why the toolkit of the UK Contingency Secretariat is one of the key guidelines as it has already implemented and evaluated.
(http://www.cabinetoffice.gov.uk/media/132679/communicatingrisk.pdf)

7 stages in risk communication strategies
1-Establish a team/network
2-Decide what you want to achieve
3-Get to know who the stakeholders are
4-Decide what form of consultation to use
5-Engage and involve your stakeholders
6-Monitoring and evaluating your strategy
7-Maintaining the policy communication strategy

Table 10: The seven stages in risk communication strategies (GICS, p.28)

3.6.1. Step one: establish a team/network

The first step in a risk communication process is the establishment of a network of specialists from policy section, information specialists, special advisers, risk improvement or business continuity specialists etc. The gaining of relevant knowledge is based on idea-sharing, discussion and debate. This will help the risk manager to

- understand internal departmental cultures and structures to discover blind spots in thinking, caused by custom, institutional remit etc.;
- understand the relationships with the media and the specific role(s) of the media with the risks
- understand the history, context and evolution of the risk. We assume that this information will mostly be provided by specialists in the specific risk domain. These specialists could later also take up the role as 'experts' and communicate with the public through the (mass) media.

The cooperation within this team will lead to shared ideas, knowledge, experience, understanding and also shared responsibility.

3.6.2. Step two: decide what you want to achieve

Setting aims and objectives is probably the most crucial step in the entire process. It involves the formulation of a sense of direction, of setting an agenda with action points. Before all policy suggestions can be extensively formulated, the risk manager should assess the policy's communication needs. The communication audit could be considered as an integral part of the risk analysis phase. The output of the audit will help the risk manager to identify the overall information needs, clarify the objectives of the risk communication, support the upcoming route, spot critical issues and focus actions.

The most important focal points relate to

- **The issue**: is it a controversial risk issue, are there uncertainties, is there a confidence issue, what are the specific risk traits etc.
- **The public perception**: is there disinterest or arousal and fear with the public, are there past experiences with similar risks that will be used as a 'template' for behaviour, what may be the emotional impact of new information, how many people will feel involved etc.
- **The role of communication**: what is the general aim of the communication strategy, who are the stakeholders and how will they be affected and involved, what are the concerns and interest of these stakeholders, how should the public perceptions (and mood) be monitored, what can be learned from passed experiences, what crisis communication strategy should be addressed and implemented when the risk turns into a crisis (pre-crisis planning)

The toolkit also offers a checklist of potential objectives:

- Maintaining **public confidence**, protection of the public or helping them to protect themselves. Accurate risk identification and public risk perceptions are the key elements to take sound risk management decisions.
- **Intelligence**: additional information input concerning the risks.
- **Knowledge**: creating a better understanding of the various stakeholders' risk perceptions.
- **Sharing ownership**: involving various stakeholders in the risk decision managing processes.
- **Openness**: stimulating debate and discussion.
- **Choice**: Providing information so that stakeholders may gain sufficient resources to control their own risk exposure or judge the implemented governmental initiatives.
- **Public information**: related strongly to the previous objective, but could also have an important input in emergency communication efforts (e.g. giving advice and information).
- **Requirements**: to set out legal requirements that involve preventive or protective actions.
- **Changing**: trying to change attitudes, beliefs, behavioural intentions e.g. AIDS prevention, anti-smoking campaigns etc.
- **Persuasion**: stimulate people to take concrete actions to tackle risks that affect the entire community e.g. vaccination programs.
- **Reassurance**: replacing fear or anxiety with knowledge and understanding. This will be very hard in the context of untransparent risks, of which very little is known.
- **Justification**: to defend and justify the government's position, decisions and initiatives.
- **Credibility**: related strongly to the previous objective. It involves building trust and increasing confidence in the government and the legitimacy of their decisions.

After having set the key objectives, the focus will have to be put on the definition and description of the various stakeholders and target groups.

3.6.3. Step three: get to know who the stakeholders are

It is essential to identify the various stakeholders in the risk communication process, identify their concerns and interests and find out their specific risk information needs. Naturally, it is almost impossible to reconcile all stakeholders' concerns and needs because some will be mutually conflicting. An additional assignment is to set up priorities based on a profits and losses analysis. Potential stakeholders could be the own department, other governmental departments, the public sector, the private sector (including professional associations), nongovernmental associations, pressure groups, victims groups, charities, international stakeholders and last but not least, the general public. The general public is of course a very broad concept as the public will be fragmented into specific communication target groups. The stakeholders can be categorized into four groups along two axes. The first dimension is interest (how much they are involved and affected), the second axe is influence (how much that stakeholder can affect the situation).

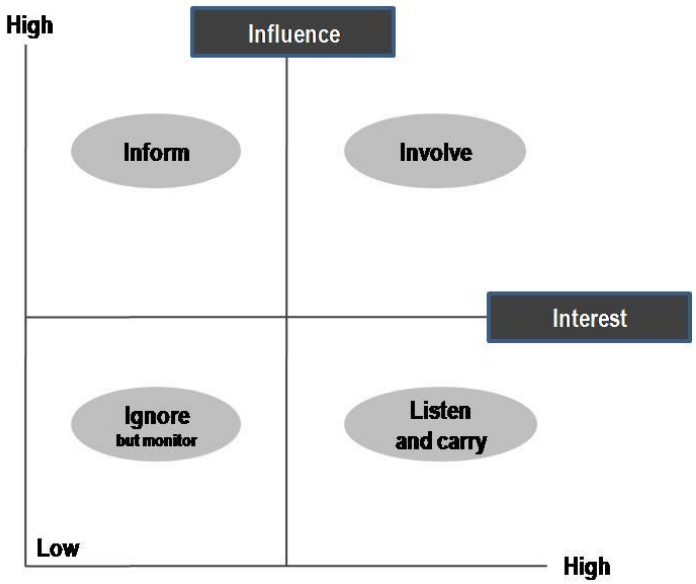


Figure 19: Two dimensional diagram (influence vs. interest) and the implications on stakeholder involvement (GICS, p.35)

The most important group of stakeholders is the group that has high influence potential and is highly involved (interested). As the toolkit states, the stakeholders' position may change during the development of the situation. The diagram should constantly be reviewed and monitored.

3.6.4. Step four: decide what form of consultation to use

Within this stage, the risk manager should first decide what the primary objectives of the consultation of the stakeholders should be. The form of the consultation will strongly depend on these concrete objectives. Some examples of objectives are: defining problems, establishing the complexity of a risk issue, testing out proposals, building a consensus, identifying and understanding the risk perceptions and the emotional and cognitive responses, assuring the stakeholders of their active contribution to the policy making process, gaining acceptance by sharing information, etc. The next step after the formulation of the objectives, is managing expectations. Depending on the objectives, clear expectations and guidelines should be provided to the stakeholders that will be involved. Information about what is expected from them in terms of contributions, what they will gain from taking part and last but not least also to which extend their input will influence the decision making process.

3.6.5. Step five: engage and involve your stakeholders

The form of stakeholder involvement will depend on the particular circumstances and objectives. The toolkit advices to integrate multiple approaches and tools to gain or exchange information and to discuss with stakeholders. Both face to face (workshops) as e-consultation tools (such as internet discussion forums) can be used. Public involvement methods can be categorized in two main forms:

- **Consultation**: includes a two-way relationship in which the feedback on policy proposals is demanded from stakeholders (e.g. citizens).
- **Participation**: includes a more active relationship between the various stakeholders. The stakeholders (e.g. citizens) are perceived as partners that actively participate in defining the process and developing the policy.

Several involvement methods can be implemented. The subjoined scheme provides an overview of the most common methods, mentioning their aims, advantages and disadvantages. The toolkit also offers various examples of electronic methods of consultation such as electronic letterboxes, e-mail distribution lists, internet based forums, online live chat events, online chat events and interactive games and scenario planning. One of the most important things to remember when consulting stakeholders is that the provision of feedback is essential. Feedback consists of sharing the outcome of the exercise and any resulting decisions. Providing feedback can enhance the legitimacy of the final policy by showing that it was subject to a public involvement process.

Objective	Method	Advantages	Disadvantages
Seeking input and feedback Written consultations Mostly quantitative research*	Questionnaires Surveys - Paper based - By telephone / face to face - Online	+ Getting views on detailed and potentially more complex proposals + Reaching large numbers/getting a representative sample + Reaching a large audience quickly (especially online tools) + Getting behind statistics	- Limited space for in depth feedback - Opinion rather than judgment - Dependent on good response rate - Selection bias (only highly involved people will respond)*
Exploring attitudes and ideas Qualitative research	Focus groups Reconverted focus groups or panel research (In depth) Interviews	+ Detailed discussions + Ideas generated + Exploring attitudes + Creativity + Delivering beneath the surface Beliefs, values, attitudes	- Discussion, qualitative but not quantification - Might want to support with quantitative data - Smaller numbers - Non-representative
Involving people in decision making Not just finding out views Giving people time to get to grips with an issue and being part of developing solutions	Citizens' juries Workshops Consensus conferences	+ Developing informed opinion + Conveying complex decision-making + Building consensus + Linking to real change	- Needs to be well-thought through - Must be taken seriously, can't be an empty exercise - Difficult to select appropriate participants (criteria? Involvement? Interests?)*

*** own adjustments**

Table 11: Overview of the most common approaches and tools to gain or exchange information and to discuss with stakeholders (GICS, p.37-39)

3.6.6. Step six: monitoring and evaluating your strategy

Monitoring and evaluating the strategy in terms of measuring progress and achievements is important for the following reasons: to make sure that the objectives are being realized, to identify and solve potential problems that have occurred during the entire process and to update the knowledge about risk perceptions, monitor the stakeholders' mood and identify new potential risks. Public involvement exercises should also be evaluated to assess the general advantages and disadvantages, successes and failures of the exercise, to assess whether it was a cost effective effort (in terms of staff and resources) and to decide whether involving the public actually contributed to improved decision making.

3.6.7. Step seven: maintaining the policy communication strategy

The last step includes a continuous review and maintenance of the communication strategy. This is important for four reasons:

- it could serve as an early warning system, developments in the risk situation and raise of new risks could be identified more early;
- it keeps the managers up to date in terms of new developments, technologies, business practices etc.;
- it keeps the risk managers in close touch with the various stakeholders, allowing them to identify shifts in influential or new groups of stakeholders and to identify changes in attitudes or beliefs.;
- it helps risk mangers to develop or adjust policies, be creative and flexible.

We can conclude this seven step program by mentioning that there are numerous other guidelines for good risk communication practices, developed by several governmental and non-governmental institutions such as the UK Resilience Center (Contingency Secretariat), Centers for Disease Control and Prevention, the US Department for Health and Human Services, the US Nuclear Regulatory Commission, the Public Health Agency of Canada, the Ministerie van Binnenlandse Zaken en Koningsrelaties, the Inter-Departmental Liaison Group on Risk Assessment (ILGRA), the Government Office for Science etc. We have added some of these handbooks in the electronic appendices (cd-rom). We have opted for the toolkit of the UK Resilience Center because of its accurateness, its practical value, its comprehensiveness and the fact that it has already been implemented in various risk contexts. The next paragraph will look into possible problems in risk communication.

3.7. Problems in risk communication

As some authors state, risk communication and risk communication planning takes place in a dynamic, socio-political context which is not controllable nor does this nature of the context forms a substantial problem for the development of solid risk communication strategies

(Gregory, 1989; Leiss, 1989b). As long as risk managers bear in mind that there is probably no way to anticipate all the external factors that may arise during the course of a risk communication development process, especially when the process is inspired by the constructive dialogue viewpoint, integrating the public as valuable partners in the risk management route (Gregory, 1989). Besides the complex environmental issues that can form barriers for effective risk communication, we can also formulate some more concrete reasons why risk communication often fails.

Scanlon formulates five general reasons: the hazard is not identified, the warning comes too late, the warning system fails for technical reasons, it is not clear what should be done or there is a human failure (Scanlon, 1990 p.233). We immediately mention the fact that these barriers are rather related to crisis communication than to risk communication, indicating that it is sometimes very hard to tell the difference between risk and crisis communication. That is why we clearly defined the difference between both concepts in 2.1. However, it is important to mention these potential problems as they indicate that the problems can be source, message, channel and receiver related. The following authors have clearly defined these four categories of problems in the context of risk communication.

Covello, Von Winterfeldt & Slovic defined these four main categories that can be used to classify problems in risk communication: message, source, channel and receiver problems (V. T. Covello et al., 1986). Handmer et al. (1990) also use these categories. The following table provides us with an overview of these categories with the specific nature of the problems. We also integrated authors that came to the same limitations and problems (Leiss, 1989, 1989b; F. Rowan, 1996; Slovic, 1987). The subjoined scheme provides us with an overview.

Origin	Nature of the problem
Message problems	- High level of scientific complexity of data, models and methods ⇨ Uncertainties in data and risk estimates ⇨ Discrepancy in definitions of the risk by laypeople and experts ⇨ Difficult to communicate intelligible messages to public: how to use comprehensible language to express complex issues - Risk information can trigger fear and anxiety instead of alleviating concern - The issue of multiple messages: competing parties in risk situations often confuse the lay public with competing scientific conclusions and risk information and information that portrays 'the same situation from different symbolic realities' (Michael J. Palenchar & Heath, 2002 p.136) - Weigman and Gutteling used the findings of Johnson and Petcovic, who posed in their presentation at the annual meeting of the Society for Risk Analysis in 1986 that 60% of professionals that work in the field of risk analysis base themselves on statistical and technical-scientific data to create logical and rational messages. However, 75% of the public missed the key meaning of the message because they did not understand the message. Only a small minority (20%) of the professionals met the specific needs of the public and customized their messages to these needs using a comprehensible language (Wiegman & Gutteling, 1995)
Source problems	- Limitations of risk communicators and risk assessment experts, lack of credibility experts (F. Rowan, 1996) - Limitations in authority and resources for addressing risk problems - Lack of correct information about individual and communal risk perceptions, fears, priorities, information preferences - Lack of institutional trust and credibility - Sources use too complex, technical language
Channel problems	- Selective and biased reporting, oversimplification or exaggerated info leading to misinformation and disproportional risk perceptions (B. Combs & Slovic, 1979; T. C. Covello, 1989a), the issue of 'balance' (Einsiedel, 1989) - Focus on sensational and dramatic aspects that induce higher news value (F. Rowan, 1996) - Premature disclosure of (uncertain) scientific information - Inaccurate and distorted information diffusion
Receiver problems	- Inaccurate perceptions of risks compared to the actual risk traits (T. C. Covello, 1989a; Slovic, Fischhoff, & Lichtenstein, 1980a) - Difficulty to interpret and internalize probabilistic information (T. C. Covello, 1989a; L. Sjoberg, 1979) - Motivation issues ⇨ Lack of interest, unmotivated and uninvolved ⇨ Interest in unusual, dramatic and sensational aspects of risk information ⇨ People ignore evidence and information that contradicts their current perceptions (T. C. Covello, 1989a) - Wrong priorities in risk perceptions - Unrealistic demands for scientific certainties and a marked aversion for uncertainty in risk

	information (Slovic, 1987) - Reluctance to make trade-offs - Overconfidence in the ability to avoid harm, 'optimism bias' especially with risks that can be individually controlled (T. C. Covello, 1989a) - Resistance to change in perceptions, attitudes and behaviour ⇨ Strong beliefs: difficult to change, weaker beliefs: easier to convince with differing presentation of risk information ⇨ Rationalization of this resistance ⇨ Feeling that personal life is being intruded by governmental obligations and guidelines - Intangible, abstract and remote gains replace tangible and immediate losses for the people that have to change attitudes and behaviours - Emotional response to risks are tending to overpower the rational way of dealing with risks (Grima, 1989; Slovic, 1997; Paul Slovic et al., 2004)
Additional problems	Joint problem solving and conflict resolution - A lot of public scepticism and distrust arises as the public is often only involved when important decisions are already taken. Some might also perceive the involvement of the public in decision making processes as an attempt by governments to abdicate its legal duties and obligations. - Joint problem solving attempts by involving the public mostly characterizes distrust and confrontation rather than openness and cooperation because of the discrepancy in interests, benefits and losses. It is hard to start cooperating instead of negotiating in an open and communicative climate. It is mostly hard to accept trade-offs as the personal losses are mostly well-defined and known and the benefits are unsecure and intangible. - Sometimes it is very difficult to select the appropriate communication strategy in the context of a certain risk issue. Informing and educating the public by providing comprehensible data en information can only be efficient and effective when these educational information programs are really needed to increase preparedness and risk consciousness (e.g. especially in the context of bird flu, Mexican flu, risks that can be reduced by concrete protective behaviour). When the risk is untransparent or the conflict situation is about the equity of risk/benefit distributions or about basic values and ideological issues, educational programs are not suited to achieve the goals of e.g. changing attitudes or trust levels. - The media play a very important role in the attenuation or amplification of risk perceptions and the aura of emotions that surrounds this social risk perception. In most of the cases, the media focus on the most dramatic and sensational aspects of the risk, picking out one isolated and sometimes non-representative fact that is extensively treated by one medium, followed by a snowball effect of media coverage. In this way, the conflict situation is emphasized rather than creating an open culture of agreement and joint problem solving.

Table 12: Overview of problems in risk communication

Besides relating the problems that may occur in risk communication to the four basic elements of the basic communication process (source, message, channel and receiver), other categorizations are proposed. Handmer et al. have proposed four types of risk communications, based on their primary objectives: information and education, behaviour change and protective action, disaster warnings and emergency information and joint problem solving and conflict resolution (Handmer & Penning-Rowsell, 1990). The problems may also be categorized into these four categories, depending on the initial objectives of the communication efforts. For every type of problem, related to the four types of risk communication, we will provide some general solutions and guidelines, based on some basic works on risk communication (Burton, 1989; T. C. Covello, 1989a; Einsiedel, 1989; Gregory, 1989; Marks, 1990).

Origin of the problem	Solutions and guidelines
Type I **Information and Education**	- Use of simple, graphic and concrete material, like a multi-modal presentation including verbal and pictoral information (Marks, 1990) - Avoid technical and specialized language, communicate on a personal level with customized communication styles, recognize the importance of 'Format and Context' (Einsiedel, 1989; Marks, 1990) - The development of protocols and standardized methods for the evaluation of risk communication efforts may contribute a valuable input in the continuous process of improving risk communication strategies. Some exemplary questions that might be answered are: is the message understood? When is the message complete and effective? (Gregory, 1989) - When using specific and technical risk measurements and assessments in communication, stress strengths and limitations of these tools - Identify, acknowledge and explain uncertainties in risk estimates - Define context according to target group, identify interests and relevancy specific information - Consider the (individual or public) involvement of broader considerations related to the risk: political, ideological, cultural, etc. - Understand and recognize qualitative concerns: dread, equity, catastrophical potential
Type II **Behaviour Change and Protective Action**	- Customized communication programs to specific target audiences that have been carefully identified and described in terms of their specific risk information profiles (needs, attitudes, trust level, media use etc.), ⇨ Generate involvement - Try to generate involvement by stressing personal benefits and using credible, customized messages - Use multiple channels to diffuse information: doctors, schools, various media (tv, radio, magazines) - Present recommendations for behavioural actions by describing the strengths and weaknesses, disadvantages and benefits of the suggested guidelines, provide objective arguments to let the public convince themselves - Build on expertise, trust and credibility, use appropriate spokesmen

	(experts, government officials, ministers) that are respected and perceived to be knowledgeable, unbiased and truthful
Type III **Disaster Warnings and Emergency Information** **(pre crisis communication)**	We have discussed concrete guidelines for crisis communication in 2.2, a.o. by means of the CERC model as discussed by Sellnow et al. (2008)
Type IV **Joint Problem Solving and Conflict Resolution**	- The public should be involved as early as possible in the decision making process (T. C. Covello, 1989a; Liston, 1989a). Public involvement should primarily be an element of risk communication strategies rather than crisis communication strategies. Crisis situations are characterized by a scarcity of resources (time, communication channels overload, etc.) which does not stimulate an open communication and cooperative climate, as priorities may vary - The public should be invited to 'participative activity' rather than passivity (Marks, 1990 p.24) - The objectives of efforts to involve the public must be clearly defined. Risk communication efforts should be planned carefully and they should be evaluated in order to improve future initiatives (T. C. Covello, 1989a) - Communicate with the public in their own language, creating a forum for the exchange of comprehensible, simple, unambiguous information without focussing too much on statistics and data. - There should not be one single source of risk communication. Moreover, one source of risk communication should certainly be located within the society as the public will perceive this source as being one of them, which will increase its credibility and make communication efforts more effective (O'Riordan, 1990). All possible risk information agents should collaborate closely with all actors and stakeholders in the risk communication cycle. - In order to identify the true nature of the risk context, it is very important to discover the risk perceptions and distinguish between factual risk situations and more ideological and complex conflicts. - Customized communication strategies should be developed for specific types of conflicts and disagreements.

Table 13: Overview of solutions and guidelines

The table incorporates guidelines and proposals for solutions to deal with the problems that may arise in the four types of risk communication. In the next section, we will take a closer look at the evolution of risk communication research and the shifts in the research focuses.

3.8. The evolution of risk communication research

3.8.1. Three phases of risk communication research

Classical risk communication research before 1960 was focused especially on technical, scientific risk analysis. These studies were aimed at the quantification of risks and related potential effects, what Rip would call probabilistic risk analysis (Rip, 1986). Classical risk communication research includes studies about environmental and health risks (nuclear energy, chemical industry, technological industrial complexes). These studies can be related to risk assessment strategies. In the late sixties and at the beginning of the seventies, researchers put more emphasis on social scientific aspects of risks. Chauncy Starr uses a behavioural scientific approach to risk analysis (Starr, 1969). One of his most important findings is that the acceptability of risks strongly relates to existing social behaviour. He emphasizes the fact that voluntary risks are much more accepted by the population than involuntary risks, leading to the conclusion that perceived control is an important factor in the acceptability process of risks. This conclusion introduced a new tradition of risk communication research, where the focus shifts from scientific and probabilistic risk analysis to the study of risk perceptions. The evolution of risk communication research has also become an important research topic for some scholars.
William Leiss has extensively scrutinized the evolution of risk communication research. In "Challenges in Risk Assessment and Risk Management" (Leiss, 1996), Leiss describes three phases in the evolution or risk communication research, starting from 1975.

First phase (1975-1984)

In this first period, risk communication research was mainly focussing on quantitative risk analysis. Risk communications are developed according to comparative quantitative risk estimates. The purpose of this assessment of risk information and quantification is the development of a reliable and comprehensive risk management strategy.

Second phase (1985-1994)

According to Leiss, the radical shift between the first and the second phase can be assigned to the fact that risk communication manifestations are ranged under persuasive communication. In addition, he emphasizes the interaction effect with modern communication strategies. These strategies take into account two main factors: the profile of the receiver(s) and the intrinsic legitimation of the public perception of the subject. Also the creation of the message is a vital aspect in constructing an efficient risk communication strategy. Various authors have focussed on the realisation of concrete guidelines for communicating efficiently to diverse target groups. 'Risk Communication. Practice and

Theory' offers a review of research regarding source reliability, effective communication channels, content related aspects of the message etc (J. Gutteling et al., 2004). 'Effective Risk Communication: the role and responsibility of Government and Nongovernment Organizations" (T. C. Covello, McCallum, & Pavlova, 1989b) and "Communicating Risks to the Public' (R. E. Kasperson & Stallen, 1991) are also referred to as fundamental literature for the conception of a good communication strategy. Next to content related guidelines, the concepts of trust and source reliability are very important aspects, especially in the context of persuasive communications. As a matter of course, translating the message into the languages of the target communication groups and making the message fit to the various risk perceptions are probably the most important phases in the risk communication process. As Leiss emphasizes:

> *'(…) there is an obligation on the part of major institutional actors in society to communicate effectively about risks, not by simply touting the superiority of their own technical risk assessments but, rather, by making an honest effort to understand the bases of public risk perceptions and by experimenting with ways of constructing a reasoned dialogue around different stakeholder assessments of risk situations.'* (Leiss, 1996 p.90)

Third phase (1995 -…)

According to Leiss, the contemporary risk communication strategy is characterized by the integration of social contexts and social proportions in which risk judgements and risk conflicts take place. The trust issue is very important as well within this context. Relating to this matter, Leiss proposes the following working hypothesis: the trust in institutional risk actors (governments and industries) can be accumulated by the devotion of these institutes to communicate responsibly about risks. In this way, this *"can put pressure on all players in risk management to act responsibly"* (Leiss, 1996 p.91). Continuity and a consistent long term communication strategy are basic conditions to communicate efficiently about risks.
Turner and Wynne (stated in J. Gutteling et al., 2004) mention that the creation or recovery of the public trust by means of persuasive communication techniques evokes a contradiction: intentional cultivation of trust can be interpreted as manipulation. The perception of manipulation can impair the image of the institute as a reliable risk actor.

Leiss concludes as follows (Leiss, 1996 p.94):

> *'A good theoretical framework for Phase III may be found by extending the 'strategic environmental audit' and 'environmental responsibility' approach. This could be operationalized by the formulation of a 'code of good risk communication practice', and compliance with the code could be verified through a 'risk communication audit'*

designed to meet the test of public credibility. Some of the much needed foundations of trust might be laid in this manner.'

So Leiss has proposed a new tradition of risk communication research, where the key research objectives include the creation of tools that can serve effectively in the risk communication audit process. The concrete output of this audit can be stated in terms of good risk communication practices that can contribute to the risk management and risk communication policy developments. We interpret this 'call for research' as a holistic approach to risk research, in which the various concepts that are related to risk, such as risk perception, fear, mental distance towards the risk, media exposure, trust etc. will be related to each other. Naturally, the specific nature of each risk context will lead to shifts in strengths and directions of the relationships between the concepts. So the codes of good communication practices will vary accordingly. The perspective of Leiss has inspired us to develop and validate our central research methodology. This methodology will be presented and discussed in the empirical body.

3.8.2. Eight stages in risk communication history

Baruch Fischhoff also provided us with an evolution in risk communication of the last 20 years, until 1995 (Fischhoff, 1995). He summarized this history in 8 stages (p.138). Each stage formulates the key idea of the communication strategy. The stages have evolved historically, so each step builds upon the key design of the previous stage and each is supposed to make progress toward acquiring new skills. We have briefly summarized the key characteristics that accompany each stage in the second column.

Evolution / Stages in risk communication	Focus
1. All we have to do is get the number right	- Mastering the design, execution and operation of the technology: probabilistic risk analysis, risk control - No or little risk communication
2. All we have to do is tell them the number	- One-way communication, diffusion of risk analysis output, non-customized probabilistic info diffusion
3. All we have to do is explain what we mean by the numbers	- Full disclosure of analysis outputs, attempts to explain technical facts and figures
4. All we have to do is show them that they've accepted similar risks in the past	- Using the concept of cognitive risk comparison
5. All we have to do is show them that it is a good deal for them	- Focus on potential benefits for the public (other risk reduction, payments etc.) - Introduction of tradeoffs and integration of the tradeoff concept in the risk management process
6. All we have to do is treat them nice	- Introduction of the trustworthiness concept (communicator) and information reliability

		- Training communication skills - Development and application of good PR practices
7.	**All we have to do is make them partners**	- Involvement of the public, assigning them a more active and constructive role in the risk decision process - Incorporating public risk perceptions, accepting potential discrepancies between expert and lay risk estimates and perceptions and trying to reconcile both views - Dealing with new problems and conditions of the partnership
8.	**All of the above**	- Integration of the seven stages, with varying proportions between the stages depending on the risk, risk analysis output, audience, etc.

Table 14: The eight development stages in risk communication history (Fischhoff, 1995 p.138)

We could formulate some critiques on the overview of the eight stages.

- As Fischhoff (1995) states himself, the eight step process is rather speculative and not based on empirically based data such as content analyses of risk analysis and risk communication studies.
- The overview mainly focuses on transparent and calculable risks. Fischhoff speaks in terms of risk analysis, probabilistic data diffusion and expert views on risks versus 'lay' views. He defines risk communication problems in terms of the different languages experts use to communicate and the general 'lay' public uses to decode these complex and scientifically formulated risk analyses. The scientific positivism perspective on risk communication is dominant in this description of the evolution of risk communication, although the seventh stage already carefully introduces some traits of the constructive dialogue perspective.
- Fischhoff perceives 'the public' as one homogeneous, receptive group of people. His perception of 'the public' does not allow any differentiation between various stakeholders nor does it recognize a potentially heterogeneous and fragmented public with specific characteristics, information processing capabilities and information needs. However, we will proof the importance of a public oriented risk communication approach that takes into account the specific characteristics of these various stakeholders in chapter four.
- We could add a new phase that introduces the constructive dialogue perspective. Since the current risk society is strongly characterized by new and untransparent risks, socially amplified by various sources (opinion leaders, mass media), risk managers do not have full control anymore over the risk as such and certainly not over the communication flows that arise around these new risks. The current risk communication climate is characterized by multiple information flows that are diffused by several sources. Within this respect, the issue of source credibility and information reliability has become even more important. We have the impression that the current research climate is especially

characterized by the investigation of individual and social risk perception processes, the concepts of trust and credibility in the context of risk communication strategies and stakeholder participation in risk management practices.

Fischhoff's overview has mainly focused on the direct relationships and interactions between the risk information sources (experts, scientists) and the risk information receivers (the general public). He does not consider the role and importance of information mediators that pass the information or even interpret and transform or deform the central risk message. We will tackle one of these mediators, the opinion leaders, in chapter four. The following section will consider the role of the (mass) media in the risk communication process.

3.9. Risk communication and the media

3.9.1. News media and the selective reporting of risk information

The study of the mass media has always involved the issue of the potential influential role of the media. Some authors state that the media are generally eager participants to reinforce (or in some rare cases attenuate) the existing distribution and perception of risks (Handmer & Penning-Rowsell, 1990; R. E. Kasperson & Kasperson, 1996). The mass media are important sources of risk and crisis information, and they are very useful tools for governments to communicate with the public in times of crisis. The media can amplify or attenuate risks (Kasperson et al. 1996) by the way in which the risks are selected and presented. This can strongly influence the way in which people perceive certain risks and how their attitudes and behaviours change. The media have been criticized for selective and biased reporting that tends to emphasize conflicts, dramatical and sensational aspects, uncertainties etc. The media have also been accused of dichotomization (P. Sandman, 1987), oversimplification, distortion and inaccuracies in reporting risk information of various natures (Wilkins & Patterson, 1990)

The reasons for these limitations are plural. Many of these problems can be allocated to the nature and the characteristics of the media, how they cover risk situations and the constraints under which reporters work (T. C. Covello, 1989a) and journalists construct meanings (Dorothy Nelkin, 1987). We have summarized some of these barriers and limitations.

- There are tight time schedules and deadlines. As a consequence, reporters and documentary makers do not have the time to deal with and integrate all technical complexities and uncertainties that are linked with most risks.
- To achieve credibility, reporters strive for objectivity by presenting various views on one problem. That is why very often, there are conflicting opinions, coming from various sources (experts, laypeople, policy makers) which in the end lead to hazy risk perceptions and uncertainty with the public.
- Reporters also rely on the most accessible and extravert sources of information.

- Journalists tend to eschew the scientific risk analysis tools and results because of the high level of complexity and technical language (Dorothy Nelkin, 1987).

Especially the news media play a major role in the public judgments of risks. News media are often blamed of disseminating incorrect, biased or preselected information. Risks, and especially untransparent risks, have great news value. News media are very eager to cover these topics and so they are often blamed of unnecessarily amplifying collective concern about risks that not that harmful. Both news selection as the quality of the news coverage are crucial within this process. As for the news selection bias, there are quantitative and qualitative criteria upon which risk information is selected for media coverage.
Greenberg et al. have performed a quantitative content analysis of news reports concerning environmental risks in 1989 and came to the following conclusions: accidents and spectacular, isolated facts were reported more frequently and more detailed than risks that are more dangerous and more present but less spectacular (Greenberg, Sachsman, Sandman, & Salomone, 1989). The analysis showed that there were seven times more news reports about airplane crashes than about risks that are related to smoking, a risk which leads to almost 27 time more fatal casualties in the same period. According to Kepplinger, it is not the severity of the risk that will determine whether the risk issue will become a news item (Kepplinger, 1994). It is the fact whether the risk is considered a 'key event' that will induce its selection and media coverage. Key events are extraordinary or spectacular, mostly isolated, events that may have a large potential influence on the (news) media reality. Media coverage about such items often introduced a increase of similar news items, even though there was no objective increase of similar events in reality.

3.9.2. Active or passive role for the media?

According to Berger and Luckmann, the media play a substantial role in the social construction of the reality and in attitude formation (Luckmann & Berger, 1991).
Others are convinced that there is little evidence that the media play a major role in persuading people (Handmer & Penning-Rowsell, 1990). As Handmer et al state, using the ideas of McGuire (1986):

"That myths can persist despite conflicting evidence is illustrated by the robustness of the belief that television and other mass media have sizable impacts on the public's thoughts, feelings and actions even though most empirical studies indicate small to negligible effects." (Handmer & Penning-Rowsell, 1990 p.130)

The author also raises the idea that the media have a more apparent agenda setting role, offering the public issues to think about rather than influencing them how and what to think (Wood, 1983). They can also be appointed a gatekeeping role in the context of the selection of and reporting about risks. We can state that the information agents, as represented in the model of Kasperson et al. (1996), all have a potential hand in determining what information

and knowledge can pass through the gates of the media channels. This principle is known as the gatekeeping principle (Schramm, 1973).
Especially in the perspective of governmental risk communication, the media are considered as useful information dissemination tools. A lot of governmental representatives have put emphasis on the importance to involve the media and if possible try to control the information flow about certain risks that is created by the mass media. Principally, the role of the Public Relations department has become increasingly more important in the context of risk communication. Alvin Alm, former deputy administrator of the U.S. Environmental Protection Agency has stated that
"(…) as scientists, regulators, and policy makers, you have to figure out what the media do, how they work and how to make them work for you. (…) you have to learn to deal with media inquiry, to supply information in advance and consider the medium" (Davies et al., 1987b p.31).
We do not entirely agree with these statements anymore as the borderlines between governments, the media and the public are not very clearly defined anymore.
Besides the role of the media as agenda setters, gatekeepers and instrumental information diffusers, they can also play an important indirect role in setting the context for risk communication and serving as a concrete and useful channel to disseminate information accurately and effectively in crisis situations. Especially in the new, multi-media information society, the new media applications lend themselves excellently as communication platforms to exchange information between authorities and the public. In this way, a two way communication and information flow can be established and the public can directly be involved in the risk management process. The role of the media in the individual risk perception processes will be discussed in chapter four (3.5) since this is related to cognitive mechanisms of information processing
Now that we have discussed the role of the media in risk communication processes, we can conclude this chapter by summarizing some general risk communication guidelines and best practices.

3.10. Best practices in risk communication

We have already described potential problems in the risk communication process and offered an extensive overview of possible solutions that may help to tackle these barriers. We will now concentrate on some general risk communication guidelines, as formulated by several pioneers in risk communication research (V. T. Covello & Allen, 1988; Sellnow et al., 2008).
The 'best practices' approach is a management approach that is widely used in various professional and organizational settings to identify and even institutionalize a set of practices that have been tested in a real life setting (governmental, organizational or other professional setting). Since these best practices were tested in real-life settings and often on a longer term, it is an approach that can be considered as a form of grounded theory for

process and organizational improvement. These best practices may even evolve into industry norms because in certain cases, consistency within and between companies has been reached and the practices are accepted as valuable and have achieved the desired outcomes (Sellnow et al., 2008). So the practices are very much likely to be fixed in the form of a general set of standards, procedures, guidelines, reference points or principles.
The best practices that will be presented are based on the practices that were formulated by Sellnow et al. (2008). They are designed *"to help build constructive and mutually beneficial relationships with stakeholders, acknowledge the complex and multi-dimensional nature of both risk and communication and respond to the communication and information needs of diverse and changing audiences"* (Sellnow et al., 2008 p.21). We have added sources and advice that overlap with the nine basic advices of Sellnow et al., for instance the seven cardinal rules of Covello and Allen (1988). Covello and Allen integrated an overview of seven prescriptions for effective risk communication, based on the analyses of some case studies (V. T. Covello & Allen, 1988; Davies et al., 1987b; Hance, Chess, & Sandman, 1988).
Risk managers will not be able to implement and apply all of these best practices in one risk situation. On the other hand, they are not mutually exclusive but they can be perceived as complementary. They can be used as building blocks of a coherent approach to confront risk communication problems.

1. Infuse risk communication into policy decisions

Risk policies are often construed on best practices from the past that have been internalized. Communication is usually the method for explaining or justifying the pre-existing risk policy and it can reiterate previous arguments and positions. Conversely, the communication process can also create policy. Public statements by officials that are diffused by the media can be reinforced by incorporating them in the official policy. The last method for policy development is to systematically and comprehensively review current policies by means of empirically driven calculations and estimations on the one hand and information and communication input from various sources on the other hand.
Sellnow et al. (2008) conclude this best practice by stating that *"setting the risk policy for an organization requires both the fields of risk estimation and risk communication"* (Sellnow et al., 2008 p. 22)

2. Treat risk communication as a process

Covello's cardinal rule n° two: "Plan carefully and evaluate your efforts" (V. T. Covello & Allen, 1988 p.1)

Various models incorporate the process features of risk communication: the risk communication model of O'Riordan, as described by Handmer and Penning-Rowsell (1990), the information flow model reshaped by Baram (1984), the message transmission model as shaped by Covello that was based on Laswell's basic communication model. All these risk

communication models show that the process of risk communication is dynamic, interactive and adaptive and it involves various components on various levels: sender, receiver, message, channel, noise, contextual influences etc. Some crucial elements in the process should also be tested on effectiveness for instance the effectiveness and appropriateness of certain risk communication channels and information sources that are used (Smith & McCloskey, 1998).
One of the most important elements that can be retrieved in most of the models is feedback. Feedback provides the opportunity to upgrade the process, to improve the messages, change or add communication channels, delete noise, to meet new expectations of adapted audiences or risk situations etc. To summarize, the possibility of feedback is a vital element in the construction of more effective strategies.
Only when risk communication is perceived as a dynamic, continuous and interactive process, the opportunities of the strategies that are developed can be leveraged into valuable outcomes of diverse natures.

3. Account for the uncertainty inherent in risk

As mentioned in the previous practice, the risk context also continuously evolves and new risk information may arise very rapidly. Various risk factors interact with other variables sometimes in a very unanticipated, chaotic and non-linear way. Risk messages and communication efforts are supposed to be most effective when they are stated in equivocal terms. It is very important to take into account this specific trait of risks, acknowledge that there will always be uncertainties and integrate this directly into the risk communication efforts.

4. Design risk messages to be culturally sensitive

Some risk communication models also involve the contextual factors and more specifically the cultural and social context as important elements in the risk management process. The elements can be located on a micro and meso level (age, gender, education, language differences…) and on a macro level (culture, national history, etc.). Naturally these factors have to be taken into account when construing risk communication strategies. As Sellnow et al. state : *"understanding the personal, community and cultural influences on risk perception enables communicators to tailor their communication strategies to audience characteristics and increase the probability of success"* (Sellnow et al., 2008 p.24). The authors propose one strategy that suggests adapting the location and form of the message to fit the specific preferences and media consumption patterns of the target audience. We want to add the importance of addressing the needs and taking into account the specific information needs and media profiles of the target groups. It is important to acknowledge that there can be diverse target groups that will react differently to specific risk information types and that can

deliver specific contributions and play different roles in the risk management and communication process.

5. Acknowledge diverse levels of risk tolerance

This practice builds partly on the previous conclusion that people will have varying experiences, perceptions, tolerance levels of risk and they will process risk information differently. Perceptions of (risk) realities, that eventually result in the actual behaviour and can change the 'reality', are socially constructed (Luckmann & Berger, 1991). Risks, or should we say risk perceptions, can also be amplified and attenuated through social interaction and media coverage (R. E. Kasperson & Kasperson, 1996). A best practice in risk communication therefore acknowledges that the empirical and scientific questions and data of risk situations should not be the key components of the communication efforts, but that social constructions and all factors that are involved in this mechanism play a vital role.

6. Involve the public in dialogue about risk

Covello's cardinal rule n° one: "Accept and involve the public as a legitimate partner"
Covello's cardinal rule n° three: "Listen to your audience"
(V. T. Covello & Allen, 1988 p.1)

As stated by Sellnow et al., the 'risk sharing through risk communication' approach is partly driven by community right to know initiatives. Right-to-know acts, such as the Seveso Directive that was issued by the European Community in 1982 (B. Wynne & Van Eijndhoven, 1991), have obliged authorities and organizations to provide risk information and obliges them to clarify both the nature and the magnitude of certain risks. Besides informing the public, it is important to involve the public actively into the communication process (Leiss, 1989b; Marks, 1990). The exchange of information between the various stakeholders that are involved in the risk debate can take place through various communication platforms: community meetings, working groups, focus groups, forums, etc. These platforms are also ideal channels to gain feedback. It has been claimed that community outreach and collaborative decision making can build trust over time (M. J. Palenchar & Heath, 2007). It has also already been mentioned that public participation during decision making about risks can lead to more widely accepted risk policies. The majority of people who have directly participated in a risk decision making process are generally more supportive of the resulting policy decisions (J. L. Arvai, Gregory, & McDaniels, 2001; Gregory, 2000; McDaniels, Gregory, & Fields, 1999). However, Arvai (2003) has empirically confirmed that participants in a risk decision making process were more satisfied with the decision-making process than with the actual outcome of the decision itself. Therefore he concludes that we should perceive the benefits of public participatory decision making in terms of their ability to support and

improve higher quality decisions that are the product of more widely accepted decision processes (Joseph L. Arvai, 2003)

7. Present risk messages with honesty and transparency

Covello's cardinal rule n° four: "Be honest, frank and open"(V. T. Covello & Allen, 1988 p.1)

Seeger has defined honesty and accuracy as fundamental values of human communication in general (M. Seeger, 1997) and risk communication in specific (Davies et al., 1987b). Honesty and accuracy boost source credibility and information reliability (Ahearne, 1990) and allow the receiver to gain the information that they perceive to be valuable to their own mental risk construction and risk decision process. This process of personal risk information gathering is closely linked to the concept of self-efficacy that will be discussed in chapter four (2.6.3). As Sellnow et al. state: *"Self-efficacy is generally a very effective strategy in risk communication in that it reduces the perception of powerlessness and promotes personal responsibility and action in managing risk"* (Sellnow et al., 2008 p.26). We also strongly believe that personal control over risk information increases the feeling of self-efficacy in risk contexts and will lead to a decrease of fear. Close to honesty is transparency. Transparency is one of the key advises that is given to all risk communicators (M. J. Palenchar & Heath, 2007; Smith & McCloskey, 1998). Both horizontal transparency, between agencies (C. Chess & Clarke, 2007), as vertical transparency are vital in the interactive debate over risk issues. Sometimes, transparency facilitates the exposure of conflicting evidence, but as some state, it is better to expose conflicting arguments than conceal them when the final aim is to maintain or even increase trust (Sellnow et al., 2008). Naturally, some risk managers are skeptic and hesitate. They believe that honest and open communication may disclose e.g. trade secrets or in the context of terrorism information that may harm the security of the state. Other objections involve a possible lack of information and knowledge about a certain risk situation and this uncertainty may raise public concern. Some also think that open discussions will promote irrational concerns and fears and enhance legal liability. Obviously, authorities and risk managers will have to decide what information can be spread and what information should be handled with care to protect the knowledge or e.g. critical infrastructures etc. This does not mean that openness and honesty are not values to put out front when communicating. Providing a limited amount of information and even admitting that some information has to be kept secret for certain reasons is always better than non communication or miscommunication. Another related advice is to communicate as soon as possible and on a regular basis. The public should be notified immediately when a threat rises and the information flow should be continuous, otherwise perceptions may rise that the authorities are withholding information. On the other hand, over-assuring the public in the beginning of the risk situation without having gathered all relevant information will create the feeling that something is being covered-up.

8. Meet risk perception needs by remaining open and accessible to the public

Covello's cardinal rule n° seven: "Speak clearly and with compassion" (V. T. Covello & Allen, 1988 p.2)

Naturally, openness and accessibility relate closely to honesty and transparency. These traits are principal conditions for effective interactive communication. Accessibility has many dimensions: it involves message style, language, information form, channels use, source characteristics, receiver characteristics,…
As Sellnow et al. state: *"Openness and accessibility denotes a general attitude on the part of the organization or agency about issues of risk. As closed or inaccessible stance can create the impression that there is something to hide. In these cases, members of the public and the media often become more aggressive in their efforts to access information. In contrast, openness can help build trust and promote a sense of collaboration and risk partnership"* (Sellnow et al., 2008 p.28; Smith & McCloskey, 1998).

9. Collaborate and coordinate about risk with credible information sources

Covello's cardinal rule n° five: "Coordinate and collaborate with other credible sources"
Covello's cardinal rule n° six: "Meet the needs of the media"
(V. T. Covello & Allen, 1988 p.2)

To avoid contradictory or inconsistent messages that are diffused by various 'information agents' (governments, organizations, consumer groups, experts, opinion leaders, media,…), it would be ideal to coordinate the various information flows about a certain risk context. Smith and McCloskey also stressed the importance of a more integrated strategy for risk communication and the vital need for policy integration between several agencies (Smith & McCloskey, 1998). Naturally this is impossible, especially in the context of opaque risks that have various readings and dimensions. For the transparent risks, it is easier to centralize the information that is available and set up congruent and coherent information flows in order to increase an effective public understanding of the risk.
Collaboration and coordination means setting up the networks and infrastructures that are needed to exchange information. Constructing the paths is one thing, making people walk these paths is something else. Traditionally, the general climate of mistrust between certain governmental institutions or organizations will avert full cooperation and collaboration and the exchange of information. Of course it is difficult to change a communication climate on a very short term, but risk managers should strive to create an initial mentality of cooperation and collaboration to obtain mutual benefits. A second barrier to effective collaboration is that the information that is being spread by the public, and more in particular by opinion leaders, are harder to retrieve and to 'influence' by collaboration. Opinion leaders are rather critical (as we will see in the empirical body). On the other hand, if we can identify the

opinion leaders in a certain risk context, and we can unveil their socio demographical and media profiles, risk managers can involve these very important information agents in the risk debate. These general guidelines will contribute to effective risk communication development. However, one of the primary objectives of risk communication is convergence. The next paragraph will describe the convergence principle and the differences with other approaches of risk communication efforts like congruence, mutual exclusivity, dominance and multiple sources.

3.11. Message convergence principle in risk communication

Sellnow et al. (2008) perceive convergence as the primary objective of risk communication. They state that convergence occurs when distinct bodies of knowledge overlap, resulting in some capacity of agreement (Sellnow et al., 2008). The principle incorporates the interaction of deviating or even opposing arguments that interact and eventually form a knowledge homeostasis. The authors also elucidate convergence's distinction from congruence, mutual exclusivity and dominance. The following representation will clarify these distinctions. We have also added the likeliness and benefits of each approach.

View	Meaning	Likeliness and benefits
Convergence	Interacting and emerging (sometimes conflicting) arguments with the settlement of an agreement between the parties that is based on overlap	Most likely and very productive in the risk debate
Congruence	All parties have settled on one single, unifying interpretation of a risk situation	Ideal situation but unlikely, since the complex nature of the risk debate
Mutual exclusivity	Discarding or discrediting one body (mostly lay people) of knowledge for another, ignoring excluding the lay public, the competitive nature of risk communication prohibits any form of synergy in this perspective	Likely but least productive as the risk debate is undermined and non interactive
Dominance	Dominant presence of industry or government in the public risk debate, one-sided denial of valuable potential of other the other parties' input	Likely but least productive as the risk debate is undermined and non interactive
Multiple sources	Various parties that provide information to the debate: governments, agencies, experts, public, interpersonal sources, media etc. Multiple points of convergence are possible, but also congruence, mutual exclusivity and dominance	Most likely as the risk debate is complex and includes various sources of risk information and involved parties

Table 15: Key message principles in risk communication (Sellnow et al., 2008)

Distinction between convergence, congruence, mutual exclusivity, dominance and multiple sources in risk communication (Sellnow et al., 2008) and added likeliness and benefits

Since the convergence principle is perceived as the most important objective, we may assume that a lot of emphasis has to be put on the development of public oriented risk communication strategies that allow specific stakeholders to participate and actively contribute to the risk management and risk communication management process. We will now briefly discuss the importance of public oriented risk communication strategies.

3.12. The public as puppets or players? Importance of public oriented risk communication strategies

As we mentioned in the beginning of this chapter, we opted to base ourselves on the dialogue perspective to define, describe and scrutinize the process of risk communication. The next paragraph will therefore elaborate on the interactivity aspect of risk communication and the role of 'the public' within the risk management and risk communication processes.

Many scholars and even the National Research Council have stressed the interactive nature of risk communication and the importance of scrutinizing and customizing communication strategies to the various stakeholders and target groups. Various scholars have criticized the public information model of communication that stresses the one-way dissemination of information (R. L. Heath, 1995a; McComas & Trumbo, 2003; Michael J. Palenchar & Heath, 2002; Williams & Olaniran, 1998) that was sometimes even labeled as *"a linear, hypodermic communication process, whereby technical information can be injected into non-technical audiences"* (R. L. Heath, 1995a p.269). Poumadere and Mays have introduced the concept of 'entente' in this perspective. Entente is actually French for 'agreement'. Naturally, the authors have associated a deeper meaning with the word in the context of risk communication. Entente refers to a shared sense of reality of all stakeholders that are involved in the risk communication process. They state that this shared sense of reality is a *"prerequisite to communication inside or across any of these bounds"* (Poumadere & Mays, 2003 p.235). They also believe that the entente reconciles the scientific and lay discourse in the risk decision debate: *"science and the irrational are not mutually exclusive: they can exist side by side in the construction of a risk event"* (Poumadere & Mays, 2003 p.240). It is remarkable however that the authors place science opposite to the irrational, with the latter reflecting the public's input in the risk decision process. They take rather radical views in terms of lay people versus scientists in the risk debate. Their final aim is indeed to stimulate a debate that accommodates the expressions of various opposing views on one risk issue or context but their initial expectations are rather pessimistic in the sense that scientists always have opposing views on risk issues than lay people, who are labeled as 'irrational'. Nevertheless they strongly advocate the involvement of the (lay) public in the risk decision making process and risk communication process, and so did many other scholars (Caron Chess, 2001; T. C. Covello, 1989a; Liston, 1989a; Smith & McCloskey, 1998). Some strongly

recommended to stimulate the active rather than passive participation of the public in these processes (Marks, 1990). Naturally, when we speak about 'the public', we will have to differentiate between multiple audiences.

3.13. Multiple audiences for risk messages

Sellnow et al. (2008) have identified the need for including multiple audiences or publics in the development and transmission of risk messages. They start with an argumentation that promotes an audience-centered communication strategy over a sender-centered risk communication strategy. They claim that in most, traditional risk and crisis communication research traditions, the elite viewpoint prevails through the process of pre-crisis, crisis and post-crisis stages (Benoit, 1997; T. C. Covello, 1992; J. S. Heath, 2001a; R. Heath, 1997; R. Perry & Lindell, 2004; M. W. Seeger, Sellnow, & Ulmer, 1998; Slovic, 1986; Weick, 1988). As Sellnow et al. state: *"Elites represent those who are in positions of leadership to plan and manage the communication and actions during the pre-crisis, crisis and post-crisis stages"* (Sellnow et al., 2008 p.34). Much research has focused on the sender and how to construct effective risk communication strategies and messages. Very few studies have dealt with the receiver, and as Sellnow et al. mention, the studies that have been performed are mostly related to the importance of involving people in message testing in order to discover more effective ways to influence behaviour and attitudes (Fink, 1986; Leana, Ahlbrandt, & Murrell, 1992; McMahan & Meyer, 1997; McMahan, Witte, & Meyer, 1998). Many scholars however start from the idea that audience characteristics such as socio demographical traits or information retrieval processes are variables that affect the outcomes that are sought by the elites who are constructing risk communication strategies. These factors should actually be shaping the construction of the strategies for risk communication for multiple target groups (Coombs, 1999; R. Perry & Lindell, 2004; K. E. Rowan, 1991; Sellnow et al., 2008; Slovic, 1986; Tierney, 1994).

Sellnow et al. (2008) stress the importance of changing cultural dynamics and of cultural differences in risk message interpretation. This perspective is rather broad. In our empirical body, we will focus on the multiple audiences in terms of their differences in risk perception, specific information seeking behaviours and social behaviour as the identification of the most crucial communication target groups in communities is in our perspective more functional for creating risk communication strategies. The deliverable (socio demographical and media profiles) will be of much higher practical use.

4. Conclusion

This chapter mainly focused on risk management and risk communication management. We indicated the role and importance of risk communication within the risk management process by means of several risk management models. We concluded that communication is a vital element that should be integrated in almost all stages of the risk management cycle. However, the nature, the objectives and the flow of the communication processes may vary accordingly. We pointed out some essential differences between risk communication and crisis communication and concluded that risk communication can be both pre-crisis communication in the context of emergency and crisis management processes as risk communication in its purest sense, which has a vital role to play in risk perception management processes. This doctoral dissertation primarily focuses on risk perception and risk communication processes.

We mainly based ourselves on the dialogue perspective on risk communication to formulate various definitions and discuss several risk communication models since this perspective forms a strong base for the receiver-oriented risk communication approach of this doctoral dissertation. The integration of the seven stages of the risk communication process, based on the strategic toolkit of the UK Resilience Center (Cabinet's Office, UK) is a conscious choice as it is a very useful tool that has been implemented in various risk contexts and has strong theoretical roots. This strategic seven-step strategy offers a very valuable structure that can be used as a foundation for the creation of a customized risk communication strategy. Several problems may occur when constructing and implementing these risk communication strategies. We have summarized a lot of these potential problems in a comprehensive overview, and attempted to provide some solutions in a similar overview. Naturally, new problems may arise since risk communication is a very dynamic process that depends strongly on its key elements that could be classified into source, message, channel and receiver components. That is why we want to emphasize that the overviews are not exhaustive and can be updated and completed on a regular basis, especially when being confronted with new risk communication challenges that bring along new problems to be solved. The next section focused on the evolution of risk communication research. Leiss described three phases (Leiss, 1996) and Fischhoff incorporated eight stages in his overview (Fischhoff, 1995). We concluded that a new tradition of risk communication research has been established in which the key research objectives include the creation of tools that can serve effectively in the risk communication audit process. The concrete output of this audit can be stated in terms of good risk communication practices that can contribute to the risk management and risk communication policy developments. The new tradition incorporates a holistic approach to risk research, in which the various concepts that are related to risk, such as risk perception, fear, mental distance towards the risk, media exposure, trust etc. will be related to each other. Naturally, the specific nature of each risk context will lead to shifts in strengths and directions of the relationships between the concepts. So the codes of good communication practices will vary accordingly.

The next section focussed on the role of the mass media and more particularly the new media in the risk communication process. Besides the role of the media as agenda setters and gatekeepers, they can also play an important indirect role in setting the context for risk communication and serving as a concrete and useful channel to disseminate information accurately and effectively in crisis situations. Especially in the new, multi-media information society, the new media applications lend themselves excellently as platforms to exchange information between authorities and the public. In this way, a two way communication and information flow can be established and the public can directly be involved in the risk management process. After providing some best practices of risk communication and elucidating the message convergence principle as primary objective of risk communication, we have focused on the importance of public oriented risk communication strategies. We can conclude that risk management in general and risk communication strategies in particular need interactive and participatory approaches. Both directive (encouraging attitudinal and behavioural changes) as indirective (informational, explicatory) communication strategies can benefit from public participation. Cooperation by exchanging information can create new solutions; rapid interaction can cross time bridges and provide risk managers with information about risk perceptions, concerns and information needs. These beneficiary actions can lead to more efficient risk management strategies and in particularly a more efficient and well-considered choice of the most appropriate risk communication strategies.

Informing the public is a delicate process that should take into consideration the community's 'right to know', their need to know, the obligations to protect this public's mental and physical health, the costs of unnecessarily alarming people versus the benefits of increasing communal awareness and preparedness and the possible repercussions of premature or delayed decisions and actions.

The clash between the micro-interests of the involved communities (including various stakeholders) who view the risk on a personal and more emotional level and the macro-perspectives of the risk regulators, who view the risk in terms of societal repercussions on an aggregated, statistical data level, leads to divergent interests and a more difficult decision making process. Defining the public and drawing the profiles of the various stakeholders is a crucial element in drafting risk communication strategies as the dual construction of 'public' versus 'regulators' does not account anymore. The 'public' does not exist, neither does 'the public's need for one single type of information'. The diversity of public concerns and perceptions requires the development of special, customized and targeted forms of communication (Gregory, 1989). In the empirical body, we will try to come up to this issue of profiling the diverse public groups and their specific information needs.

CHAPTER THREE

TRUST, CREDIBILITY AND STAKEHOLDER PARTICIPATION IN GOVERNMENTAL RISK COMMUNICATION

1. Introduction

A risk is often considered as something that needs to be avoided. However, it can also be perceived as an opportunity. By identifying a potential threat and analyzing its specific traits, governmental institutions will be better prepared because risk and crisis emergency plans will be constructed. Of course, when a risk develops into a crisis, the consequences will always directly or indirectly affect several groups of people. These potential consequences can induce public concern, which is a factor that may undermine effective risk and crisis management. That is why it is of vital importance to scrutinize the public perceptions of various risks and identify the specific needs. With this information, solid risk management and more specifically risk communication strategies can be developed. As mentioned previously, communication is one of the key drivers throughout the entire risk management process. Let us summarize some important reasons for this. Firstly, good and effective communication can prevent risks turning into a crisis since it may stimulate preventive behaviour and raise preparedness levels. Secondly, the provision of valuable and customized information will allow people to create, adjust or maintain their attitudes, to make well-informed choices and to stimulate their preventive behaviour. Thirdly, open and transparent communication, ideally combined with interactive two-way interactive communication flows, will facilitate the implementation of risk management policy decisions. Last but not least, good risk communication will reassure the public and will help to build or amplify trust and confidence in the governmental institutions and more specifically in the risk information that will be spread by these institutions. This chapter will pay special attention to the concept of public participation in risk management and governmental risk communication and to the importance of trust and credibility for effective risk communication practices.

2. Governmental risk communication roles

Governments have a moral responsibility to protect the population and to ensure that people obtain the possibilities to make well-informed choices whenever necessary. This statement involves two principal roles of the government in the context of risk management: risk regulation and risk communication. These roles are complementary as we have already mentioned that risk management involves strongly embedded risk

communication efforts throughout the entire management process. The Civil Contingencies Secretariat at the UK Cabinet's Office has defined three main perceived roles of the government as a risk communicator (GICS). The subjoined table provides an overview of the core communication needs (p.17).

Information	- Information about the nature of the risk, i.e. its likelihood and potential consequences - Information about the reliability of risk assessments, including information on where the facts are uncertain or disputed, or where assessments are based on assumptions or opinions - Information about who is responsible for managing the risk - Information about the choices and options open to them to control their exposure to the risk or mitigate the consequences
Assurance	- Assurance that advice and decisions are based on robust information and analysis, and that action is being taken to reduce uncertainty - Assurance that the necessary procedures are in place to manage the risk - Assurance that those responsible for assessing and managing the risk are exercising leadership, acting competently and in the public interest
Involvement	- An opportunity to be involved in the process of assessing the risk and in deciding what action to take

Table 16: Three perceived roles of the government (GICS, p.17)

The information needs of the public will vary according to the specific risk contexts. According to the risk context, the shift in information priorities will depend on the perceived role of the government. The following table provides an overview of the three different roles and relates the primary and secondary communication needs to these roles.

Government's perceived role	Primary communication needs	Secondary communication needs
Advisory	Information	Assurance involvement
Protective	Assurance	Information involvement
Redistributive	Involvement	Information assurance

Table 17: Three perceived roles of the government and related communication needs (GICS, p.18)

When governments have to take up an **advisory** role, the main focus will be on informing the public: providing clear and accurate information about the risk situation that will allow them to make well-informed decisions. The primary need is assurance that the information is unbiased and evidence-based.

When the perceived role has a **protective** nature, the primary communication objective will be assurance. People want to be certain that effective initiatives are taken to address and

control the risk. Information provision will also be important for target groups that need to take action. If people are confident that the government has control over the risk situation, they will not need extensive information about the nature of the risk and they will not have the need to be actively involved in the decision process.

When the government will act to **redistribute** risks and benefits between various stakeholders, for example in planning decisions, this will often be accompanied by an imposition of risks to certain groups of people. If this is the case, people will feel the need to be involved in the decision process to make sure that their own interests are safe-guarded. Information assurance is the secondary need since they will need explicit information to help them understand the risk situation and make well-informed decisions and contributions to the decision process.

Naturally, the role of the government as risk communicator may evolve as risk situations may rapidly evolve and their intrinsic nature may change. Also, the information needs can be different for the various stakeholders and even within the general population information needs and perceived roles may vary. This induces the need to constantly monitor the information needs of all stakeholders. In case of redistribution of risks and benefits, there will be a stronger need for public involvement and other stakeholder participation.

3. Public participation in governmental risk management

The relationship between citizens and governments has evolved. Increasingly more citizens want to play an active role in the decisions that affect their lives. The democratization of decision making processes is partly due to a better educated and informed public. The new and rapidly evolving information environment has induced a disclosure of information, certainly in the field of risk communication. The dissemination of risk information is no longer solely in control of the government or other regulatory institutions. People have access to various risk information sources and they have the resources to diffuse their own contents concerning risks globally through various information channels (internet forums, websites etc.). Governmental risk information strategies have to face the challenge of a public that is no longer deferential and unquestioning. Also scientific authorities have to defend their position as trustworthy information sources. The rise of powerful non-governmental organizations and special interest groups is a sign of a public that is somehow disenfranchised from its government. One fundamental solution is to come up to the need for a cooperative strategy in policy making and involving the public.

One of the key arguments for governments to provide information about risks is based on the principle of democratic participation in decisions and on educational objectives. The previous chapter already emphasized the importance of stakeholder involvement and active public participation in risk management and risk communication (Joseph L. Arvai, 2003; Caron Chess, 2001; T. C. Covello, 1989a; Liston, 1989a; Marks, 1990; Smith & McCloskey, 1998).

Public participation plays a very important role in the construction of trust (M. J. Palenchar & Heath, 2007). In this way, governments obtain the specific role as facilitator of the two-way communication process instead of a role as persuader. The increasing importance of two-way communication and stakeholder (public) participation has also been confirmed by various scholars (Ahearne, 1990; Gurabardhi, Gutteling, & Kuttschreuter, 2005). Gurabardhi et al. empirically scrutinized the communication flow, strategy and stakeholder participation in the risk communication literature during the period of 1988 till 2000 and found an increase in published articles that integrate the two-way communication flow and stakeholder participation. The theoretical perspective they use is that of control mutuality. Control mutuality emphasizes the interaction between the various stakeholders in the decision making process and recognizes the potential of mutual influence, rather than unidirectional control of one stakeholder over the other (Gurabardhi et al., 2005 p.499).

Chess et al. (1995) conducted a study that included in-depth interviews and a survey study that scrutinized what research topics are the most important according to risk communication practitioners and researchers. They also emphasized the growing interest of practitioners and researchers in bottom-up participative communication processes (C. Chess, Kandice, Salomone, & Hance, 1995). It is no longer the question whether an input from diverse communities should be solicited and incorporated that occupies academics and governmental communication experts. It is a matter of finding the right way to do so. 'Public participation' are the key words in the participatory democracy with regard to the management of risks. The main challenge for policymakers will be to efficiently make effective and qualitative decisions with the limited resources in terms of time and money while involving the public (Davies et al., 1987b). The respondents from the study of Chess et al. all agreed on the priorities of scrutinizing the relative effectiveness of mechanisms to solicit input (C. Chess et al., 1995; Fiorino, 1995). Based on these researches, government agencies may democratize certain issues of their decision making processes and risk communication policies. They also emphasized the importance of discovering the risk information needs of communities and the importance of evaluating the risk communication efforts.

Horlick-Jones et al. suggested a summary of the role of the government in the establishment of an interactive risk communication dialogue. To use their words:

"Governmental agencies in particular must be unflinchingly even-handed, and above all independent in all their risk communication activities" (Horlick-Jones, Sime, & Pidgeon, 2003).

In this way, the governmental institutions will be able to take up their roles as trustworthy risk communicators and risk information brokers. Naturally, public involvement in risk decision processes is a difficult assignment as the concrete implementation includes some barriers:

- Language: the officious language of government officials, the scientific language of academics and experts and the normal language of the lay public are not always congruent.

- Population representation through selected representatives of the various communities or by accepting people that have volunteered to participate in the meetings but are not really representative.
- Communication channels: two way communication platforms are rather expensive to construct and maintain and for some issues there might be an overload of data and information.
- As described previously, many people interpret complex messages, especially when there are multiple messages that are sometimes conflicting heuristically (L.A. Kahlor, 2003). Instead of interpreting the raw information and data in the message, the receiver focuses on the source's identity and non-content cues that can be perceived as traits of credibility. We can perceive credibility as a non-content cue.

Trust and confidence are probably the most crucial influential elements in effective risk management processes that involve stakeholder participation. Unfortunately, the rapidly emerging (and often 'new') risks have induced a general distrust in the authorities when it comes to the risk management capabilities. Survey data have indicated that public confidence in both the industry as in the governments has been eroded (Lipset & Schneider, 1983; Löfstedt, 2005) and the level of credibility of governments as an information sources has dropped considerably (Wiegman & Gutteling, 1995). The drop of public confidence and erosion of the credibility levels have induced a regulatory dilemma. Löfstedt has proposed four premises that can serve as a foundation for research to develop solutions for these regulatory dilemma's (Löfstedt, 2005 p.5):

1. Regulation is essential. Regulation offers advantages for both efficiency and equity.
2. Regulatory bodies need to have public trust. This is a fundamental premise for effective and influential policy implementation and risk communication (Ruckelshaus, 1983)
3. Public trust in regulatory bodies is vulnerable, uneven and may even be declining overall. There is evidence for this statement and several authors have already confirmed it (Wiegman & Gutteling, 1995).
4. There is a need to re-examine the use of the various risk management tools. This is a direct consequence of the previous premise. In order to boost or support the public trust in governmental risk regulation, risk management and especially risk communication will have to be reconsidered and upgraded to the new and rapidly evolving risk contexts.

Many studies have also shown that individuals and communities perceive most federal and state agencies as untrustworthy (L. J. Frewer, Howard, Hedderley, & Shepherd, 1996; J.F.J.M. & Heath, 1987; Slovic, Flynn, & Layman, 1991). Freudenburg used the term 'recreancy' to describe the tendency that trust in the ability or competency of institutions to fulfill their responsibilities is crucial (Freudenburg, 1993).

4. The trust determination theory

Continuing on the previous paragraph which mentions trust as a vital building block for successful risk communication, the trust determination theory also proclaims that proactive handling is essential in establishing trust. Trust is a necessary condition for the success of several risk communication objectives, such as education, information sharing, increasing preparedness and awareness etc. (T. C. Covello, 1998a; V. Covello & Sandman, 2001a; Earle, 2009; Earle & Siegrist, 2008; Jan Gutteling et al., 2006; R. Peters et al., 1997a; M. Siegrist, 2008). Before discussing the vital role of trust and confidence in risk communication processes, we will first define the multidimensional and complex concept of trust.

4.1. Definitions and dimensions of trust

Kramer and Tyler have mentioned that there are at least 16 definitions of the word 'trust' (Kramer & Tyler, 1996). Löfstedt interprets Kramer and Tyler and states that trust is *"an expression of confidence between the parties in an exchange transaction and can either be process/system or outcome based"* (Löfstedt, 2005 p.6). Mostly, it is both: people may trust risk regulators based on their subjective judgments in the risk management and policy development processes as such or they may judge (trust or distrust) regulators based on the outcomes of previous risk management initiatives. This duality can also be retrieved in the definition of Giddens:

"Trust may be defined as confidence in the reliability of a person or system, regarding a given set of outcomes or events, where the confidence expresses a faith in the probity of love or another, or in the correctness of abstract principle" (Giddens, 1997 p.34).

The definition uses the concept of confidence to define trust. Certain theories of cooperation use the distinction between trust and confidence as a key element, but Siegrist et al. state that this dual-mode approach has very little impact on the empirical studies (M. Siegrist, Gutscher, & Earle, 2005). They define general trust as the conviction that one can rely on certain people and general confidence as the belief that uncertainty is low and everything is under control (M. Siegrist et al., 2005 p.145).

Earle (2009) has dealt with the trust and confidence issues in the context of the financial and economical crisis (Earle, 2009; Earle & Siegrist, 2008). He specifies the differences between trust and confidence as follows:

"Trust is social and relational; confidence is instrumental and calculative. We define trust as the willingness, in the expectation of beneficial outcomes, to make oneself vulnerable to another based on a judgment of similarity of intentions or values. Confidence is the belief, based on experience or evidence (e.g., past performance), that certain future events will occur as expected." (Earle, 2009 p. 786)

So according to Earle, trust is actually about the relationships between people and confidence is about the relationships between people and objects (or processes), leading to

the two main approaches that Earle suggests for risk management practices: one based on political processes and one based on technical processes.
Renn and Levene did not involve the concept of confidence but defined trust in the context of communication as follows:
"Trust in communication refers to the generalized expectancy that a message received is true and reliable and that the communicator demonstrates competence and honesty by conveying accurate, objective and complete information." (Renn & Levine, 1991 p.179)
The complexity and multidimensionality of the trust construct has been pointed out by various scholars (Braithwaite, 1998; L. J. Frewer et al., 1996; Branden B. Johnson, 1999; Lewicki, McAllister, & Bies, 1998; Mayer, Davis, & Schoorman, 1995; Metlay, 1998; R. Peters et al., 1997a; Petts, 1998; Renn & Levine, 1991). We will now provide an overview of the main classifications of trust dimensions.

Löfstedt has formulated and described three main components of trust: fairness, competence and efficiency (Löfstedt, 2005).
Fairness can be defined in terms of the dual interpretation that is either process related or outcome related. Impartiality is the key word that is related to fairness. It pones the question whether the regulators are acting out of self-interest or whether they involve the interests of all stakeholders, including the public. Nelkin also mentioned that a lack of trust may be due to the partiality of experts and regulators that act in their own self-interest (D. Nelkin, 1992). **Competence** is viewed by Slovic as the most important component of trust (Slovic, 1993). Competence can be assessed by strict evaluation of the regulators. If the perceived competence of the regulators is too low, regulators should consider engaging experts into the process. **Efficiency** is mostly used in terms of how the regulators initiatives, for instance expenditures, can have effects on the well-being and welfare of the public and the stakeholders in general. We might add that perceived efficiency may vary across these stakeholders as they often have different perceptions of the situation and have set different priorities.
Löfstedt has also proposed a risk management decision tree, integrating the concept of trust as key driver to take decisions (Löfstedt, 2005 p.131).

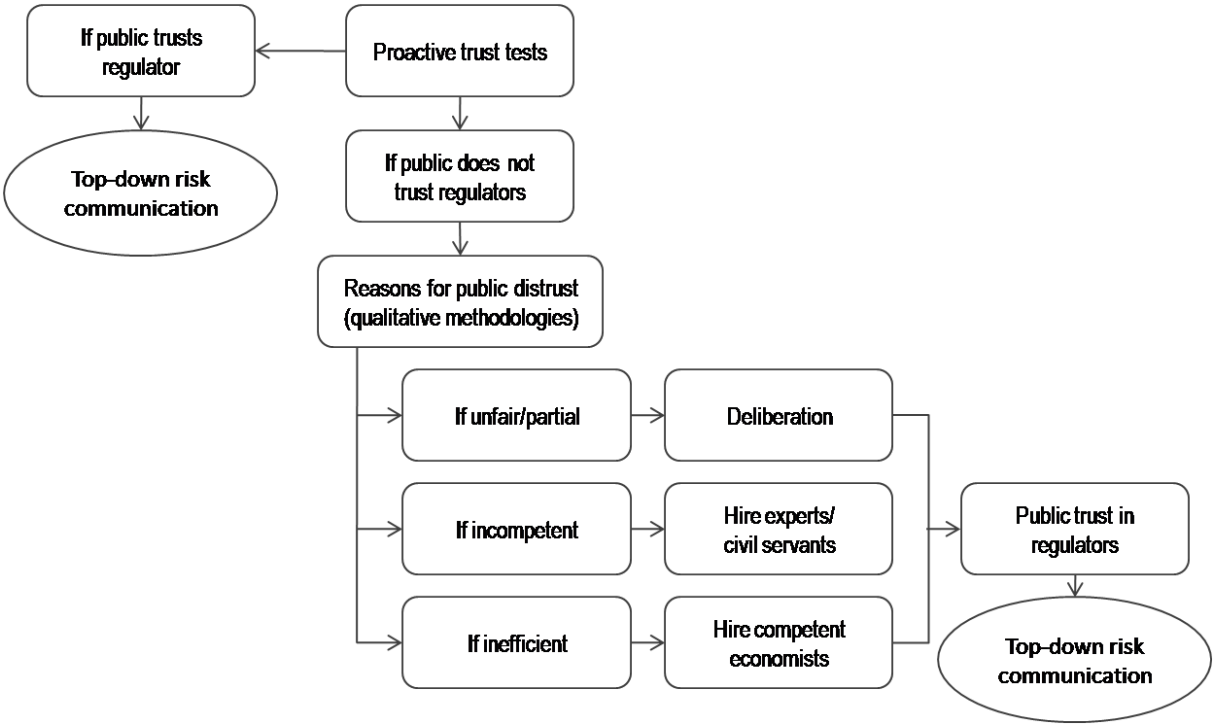


Figure 20: Risk management decision tree (Löfstedt, 2005 p.131)

The model strongly integrates the idea of top-down risk communication when public trust in regulators is high, repelling a deliberative process where interest groups and the general public are asked to participate actively. Löfstedt even suggests to actively discourage the public from participating in the risk debate and the policy making process because the request for active participation when there is no distrust might induce arousal and certain stakeholders might exploit the opportunity to promote their own interests and delay the decision making process.

If there is distrust, the first thing to do is to determine the nature of the distrust cause. Löfstedt integrated the three dimensions as potential reasons for distrust: unfairness or impartiality, incompetency and inefficiency. The first scenario appoints (perceived) partiality and requires stakeholder involvement in the decision - and policy - making process in order to increase the level of perceived participation. For incompetence as an attenuating factor, Löfstedt advises to engage external experts that may be perceived as being more impartial, objective and especially more competent. The last factor, inefficiency, is mainly formulated in economical terms. Löfstedt advises to engage economists and financial experts who may recalculate and scrutinize the expenditures, suggest altered investment policies and, by doing so, increase the perceived level of efficiency.

The decision tree offers a structured view on the risk communication process, which is mainly determined by the presence or lack of trust in the risk regulator. However, the final outcome is always a top-down and one-way oriented risk communication flow. We are critical about this outcome since we have strongly advocated the dialogue based risk communication strategy that incorporates public participation and two way interactive information exchanges in the previous chapter and section. We accept that trust can be

defined in terms of the three main components that Löfstedt proposes, but competency and perceived impartiality are traits that will mainly be driven by (pro) actively involving the stakeholders in the risk management and risk communication processes.

Besides Löfstedt, Renn and Levine also formulate five basic elements of trust (Renn & Levine, 1991 p.180-181), for which they amalgamated suggestions from academic literature (Garfinkel, 1967; Lee, 1986; W. J. McGuire, 1985):

1. Perceived competence: appoints the degree of technical expertise of the message or the source
2. Objectivity: lack of biases in information as perceived by others
3. Fairness: acknowledgement and adequate representation of all relevant points of view
4. Consistency: predictability of arguments and behaviour based on past experience and previous communication efforts
5. Faith: perception of good will in composing information

They mention that trust needs all five components, but a certain lack in compliance in one component can be compensated *"by a surplus of goals attainment in another attribute"* (Renn & Levine, 1991 p.180). This five dimensional perspective partly overlaps with the four dimensional classification of Löfstedt.

Kasperson, Golding and Tuler define four components of trust: commitment to a goal and fulfilling fiduciary responsibilities, competence, caring and predictability (R.E. Kasperson, Golding, & Tuler, 1992). Covello set up a combination of four factors that underlie perceptions of trust and credibility: caring and empathy, dedication and commitment, competence and expertise, honesty and openness (T. C. Covello, 1998a; V. T. Covello, 1993b). The subjoined table adds some important guidelines that affect the key factors.

Factors	Relevant / influential guidelines
Perceived empathy and caring	The institution should care about similar things The institution should be able to see the risk situation from various viewpoints and empathize with the concerns of all parties The institutions should listen carefully to their stakeholders
Perceived competence and expertise	Information relating to the specific traits of the institution and the traits of the spokesperson (education, experience, knowledge, presentation skills, etc.) Information relating to the institutions' affiliations and associations
Perceived honesty and openness	Importance of actions, words, non-verbal cues that convey truthfulness, candidness and accessibility.
Perceived dedication and commitment	Importance of actions, words, non-verbal cues that convey diligence and hard work in the pursuit of general public safety.

Table 18: Key determining factors of trust and relevant guidelines (T. C. Covello, 1998a; V. T. Covello, 1993b)

The listing of guidelines is not exhaustive but incorporates some general principles that clarify the factors. In 'The determinants of trust and credibility in environmental risk communication', one of the fundamental articles related in this specific field of interest, Peters et al. attempt to reconcile the various dimensions of trust that have been defined by other scholars (R. Peters et al., 1997a). The surplus value that the research of Peters at al. delivers is that the three dimensions have empirically been confirmed by means of survey research. They have also tested other hypotheses and one of the main conclusions was that "*defying a negative stereotype is key to improving perceptions of trust and credibility"* (R. G. Peters, Covello, & McCallum, 1997 p.19). The institution's perceived image, which is also based on perceived competences, will strongly influence the level of initial trust in the institution. A government that has failed in the concrete risk regulation will not have a positive image as a problem solver. The general confidence in this government will be low and uncertainty levels in new risk situations will rise. In many risk situations the governmental risk management and risk regulation processes have been successful, but very little attention was paid to effective risk communication. So even though the risk regulation was very good, governments lost credibility and public trust due to miscommunication or non-communication. As we will discuss further on, trust is also a vital element in gaining public support for governmental risk policies and concrete governmental initiatives for risk regulation. The subjoined table summarizes the dimensions of trust as proclaimed by the scholars that have scrutinized trust in risk management and links them to the classification of Peters et al.

Authors	Dimensions	Classification Peters et al.
Renn and Levine (1991)	1.Perceived competence	Knowledge and expertise (1)
	2.Objectivity	Openness and honesty (2,3)
	3.Fairness	
	4.Consistency	Concern and care (4,5)
	5.Faith	
Kasperson, Golding and Tuler (1992)	1.Commitment to a goal	Concern and care (1, 2, 3)
	1.bis perceptions of objectivity, fairness and info accuracy	Openness and honesty (1.bis)
	2.Fulfilling fiduciary responsibilities	
	3.Caring	Knowledge and expertise (4,5)
	4.Competence	
	5.Predictability	
Covello (1992, 1993)	1.Caring and empathy	Concern and care (1,2)
	2.Dedication and commitment	Knowledge and expertise (3)
	3.Competence and expertise	Openness and honesty (4)
	4.Honesty and openness	

Mayer (Mayer et al., 1995)	1.Ability 2.Benevolence 3.Integrity	Knowledge and expertise (1) Openness and honesty (2,3) Concern and care (3)
Peters, Covello and McCallum (1997)	1.Knowledge and expertise 2.Openness and honesty 3.Concern and care	
Metlay (Metlay, 1998)	1.Affective component 2.Competence component	Openness and honesty (1) Concern and care (1) Knowledge and expertise (2)
Johnson (Branden B. Johnson, 1999)	1.Competence 2.Care 3.Consensual values	Knowledge and expertise (1) Concern and care (2) Openness and honesty (3)
Löfstedt (Löfstedt, 2005)	1.Fairness 2.Competence 3.Efficiency	Openness and honesty (1) Knowledge and expertise (2,3)

Table 19: Overview of the dimensions and classifications of trust

Contradictory to the limited number of dimensions that the previous authors suggested, Frewer et al. suggested that trust (and distrust) is clearly multidimensional. By means of elaborate survey analysis they concluded that trust cannot be predicted by single items or psychological constructs (L. J. Frewer et al., 1996), as claimed by the authors summarized in table 19. The conclusion of the study was that specific information sources can be associated with particular characteristics which differentiate in the extent to which they are trusted by the public. They do state that risk is related to perceptions of accuracy, knowledge and concern with public welfare, concepts that can be related to the three dimensions that had been previously proposed by Peters et al.: openness and honesty, knowledge and expertise, and concern and care. However, they propose a more differentiated approach that suggests that every information source may gain or lose trust depending on its efforts and capabilities of meeting the specific expectations of the public regarding these specific characteristics that induce trust. Naturally, in order to discover the expected traits that the source should live up to, institutes, such as the governments, should examine their stakeholders and try to discover their perceptions.

Now that we've defined trust and summarized some of the proposed classifications of dimensions of trust, we want to conclude by citing the five levels for analyzing trust, as proposed by Renn and Levine (1991, p.181).

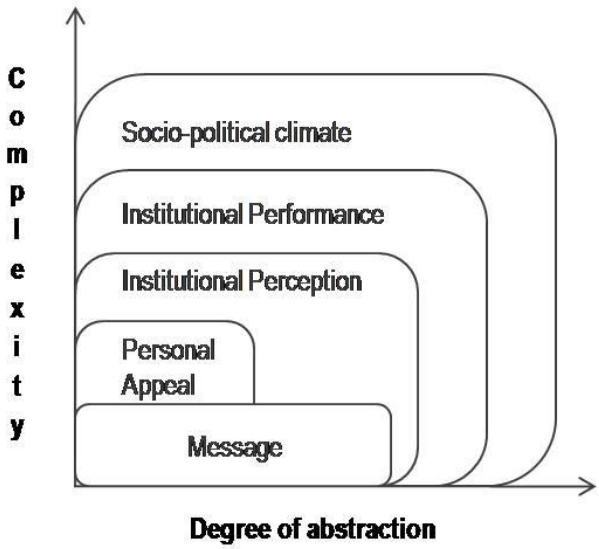


Figure 21: Levels of analysis of trust (1991, p.181)

The schematic overview illustrates the cumulative nature of the five levels of analysis of trust: trust in the communicator, trust in the message, confidence in an institution based on source perception, credibility of institutions based on institutional performance and climate for trust and credibility in a macro-sociological and political context. The levels are ordered in terms of degree of abstraction and complexity. The overlap and order of levels integrates the principle that, when trust building efforts are implemented or violated on lower levels, this will affect the next higher level and even push trough to the highest level. On the other hand, as Renn and Levine state*: "Distrust on a higher level sets the conditions and determines the latitude of options for gaining or sustaining trust on a lower level"* (Renn & Levine, 1991 p.181). The most important contribution of Renn and Levine however, is the development of an overview table that integrates the key variables in each of the five levels and illustrates their interrelatedness. This overview is essential for theoretical and empirical research of trust in the context of risk.

FACTORS OF CREDIBILITY FOR DIFFERENT LEVELS OF ANALYSIS	
Message	
Positive	**Negative**
Timely disclosure of relevant information	Stalled or delayed reporting
Regular updating with accurate information	Inconsistent updating
Clear and concise	Full of Jargon
Unbiased	Biased
Sensitive to values, feras and concerns of public	Inconsiderate of public perception
Admits uncertainty	The absolute truth
From a legitimate reputable source	From a questionable source
Organize message	
Use of metaphors	Too literal
Explicit conclusions	Receiver derive own conclusion

Positive information recorded in early part of message	
Forceful and intense	Dull
Person	
Positive	**Negative**
Admits uncertainty	Cockiness
Responds to emotions of the public	Indifference
Appears competent	
Similarity with receiver	Perceived as outsider
Has some personal stake in the issue	
Clear and concise	Too technical
Perceived as expert	
Perceived as attractive	
Charismatic	
Trustworthy-honest, altruistic and objective	
Institutions	
ABSTRACT	
Positive	**Negative**
Healthy economy, low inflation, unemployment	Recession
	High inflation, high unemployment
New administration, new ideas	Corruption
	Domestic violence or unrest
Period of relative tranquility	
Perception of competent leadership	Poor leadership
Perception of altruistic motivation	Image of self-serving motivation
Peace	War
CONCRETE	
Positive	**Negative**
Positive personal experience	Negative personal experience
Strong, competent leadership	Incompetent
Positive P.R.	Layoffs/hiring freeze strikes
Sound environmental policy	Irresponsible environmental policy
Produces safe and good service	Poor quality goods/services
Positive past record of performance	Negative past record of performance
Reasonable rates	Exorbitant prices
Undertakes socially relevant tasks	
Practical contributions to everyday life	
Benefits outweigh costs	Magnitude of risk taking greater than benefits
Political – cultural context	
Positive	**Negative**
Faith in institutional structures	Perception of structural decline
Checks and balance systems functioning well	Poor leadership/incompetence
	Corruption/scandal

New and innovative ideas	Energy crisis Perception of unfair taxation Perception of worsening financial situation Social unrest Terrorism

Table 20: Factors of credibility for the five levels of analysis of trust (Renn & Levine, 1991 p.182-183)

As we can deduct from the table, the number of factors that influence credibility and trust, both in a positive as in a negative way, is very large. Renn and Levine have composed an elaborated overview, which can serve as a valuable tool to scrutinize certain aspects of credibility and trust. The overview is especially useful for practical purposes and the concrete creation of communication strategies. It can easily be integrated in best practices manuals. Although the table is not based on empirical evidence, the added value of the table can be allocated to its comprehensiveness, as it includes many factors, but also to its simplicity, as it categorizes all the factors into four main categories (factors related to the message, persons, institutions, and political-cultural contexts). In the next paragraphs, we will discuss the importance of trust as an essential element in risk communication.

4.2. Trust as a vital element for effective risk communication

In general, trust is a popular research object within the discipline of social sciences. Trust is perceived as a lubricant for social interactions. Trust is also perceived as an important element of the social capital and as a condition for a healthy and flexible democracy and economy. In the field of risk research, there is general conformity that trust in risk management institutes is very important in the perception and acceptance of risks. One of the scholars that discussed this statement was Wynne (1980). He stated that, within the context of technological risks, some of the differences between expert and lay perspectives could lead to varying evaluations of the trust in and reliability of risk management institutes (B. Wynne, 1980). Since his study, much attention has been paid to the relationship between trust and risk perception (W. Poortinga & Pidgeon, 2003) and the role of trust in social theories of risk (L. Frewer, 2003; Holmström, 2009).
The trust issue is a non negligible issue in the risk communication process. Academic literature proofs that trust is an important factor in the effectiveness of risk communication (Beck, 1992; Fukuyama, 1996; Giddens, 1997; Porter, 1995; Renn & Levine, 1991; Sellnow et al., 2008). We cite Sellnow et al.:

"The failure to establish trust makes risk communication futile" (Sellnow et al., 2009 p.9).

Many risk communicating experts have written about this subject and concluded that the source of information and advice in a risk context needs to have a satisfactory level of trust

in the judgment of each public that is involved (Renn & Levine, 1991). Trust is something that is normally built on a long-term basis. This intrinsic characteristic conflicts with the current short-term, unexpected and opaque risks that are rapidly emerging in the new risk society. The number of risks and threats are increasing and the people are becoming aware of it through the fast diffusion of information about these risks in the community. This can strongly influence the public's opinions and their confidence in both corporate institutions as governments as the latter are not capable of responding immediately and accurately, as required when being confronted with these new types of risks. As Smith and McCloskey state, *"A level of concern has developed that has begun to erode credibility in the expertise of these institutions and, if credibility is not to be lost, these institutions will have to become more pro-active and effective in their response to newly emerging hazards and potential risks"* (Smith & McCloskey, 1998 p.47). The shift in the nature of risks and especially in the public awareness of these risks, because of the large media coverage and possibilities for information acquisition about these risks, is conflicting with the slow and time-consuming procedures of risk management processes within private and public institutions that are not capable of taking direct actions on a very short term. Giddens has stressed the relationship between trust and uncertainty and he suggests that, in the absence of direct actions of regulatory institutions, we have come to use surrogates to mediate within risk and trust debates (Giddens, 1997; Shoham & Ruvio, 2008). One type of surrogate is the use of risk information, both of quantitative as qualitative nature. Some pone that quantitative data are well suited for risk communication (Porter, 1995). We agree with the general critique that quantitative data require a similar reading of these data and the capability of the public to decode the numbers and probabilities that are provided.
We can conclude that trust is a vital element for effective risk communication, and more particularly for institutional risk communication. That is why we will discuss the notion of the government as a trustworthy risk information broker and active risk communicator in the next section.

4.3. The government as trustworthy risk information broker

Roger Kasperson stated that there has been a dramatic change in the general attitudes towards social institutions, such as governments, with regard to their trustworthiness. He defines this as a much broader issue than certain institutional risk problems that these institutions are confronted with (Davies et al., 1987b). Davies, Covello et al. (1987b) also pone that social trust is a multidimensional construct that may vary according to the diverse social groups. So we cannot speak about one single trust or social trust issue in the context of risk communication because of the complexity of the construct. However, he states that the fact that people want to believe in the expertise of the experts that assess the risks and in the competency the risk regulators to control the risks makes it very important to fulfill this need for confirmation in the roles as risk regulators by communicating that they are in control. Again, some suggest 'coactions' as an answer to the need for effective actions to

solve the trust problem. Frances Lynn says that it is a matter of active listening to diverse groups and stakeholders, among which the general public or some specific groups that make part of the public (Davies et al., 1987b p.48).

Paul Slovic, a key figure in the literature about scientific risk analysis and risk management literature, introduced the importance of trust in his paper 'Perceived Risk, Trust and Democracy' (Slovic, 1993). He postulates that it is impossible to exclude the public in risk communication processes in our unique, participative democratic system. The lack of trust in the political and social institutions is a crucial factor in the construction of credible risk communication campaigns. The limited efficiency of risk communication efforts can be largely allocated to the lack of confidence in the communicator. Eventually, the initial attitude towards the communicator and the trust in the communicator will be important elements in the complex model that incorporates the relationship between risk perception, risk communication and credibility. The distrust in risk analysis procedures and risk management practices is fed by our system of participative observation, which is amplified by the powerful social and technological changes that systematically demolish trust. Slovic cites some current trends that characterize the risk society of today. One trend is the fact that societal concern about risk factors has increased into great extend, even though a lot of efforts have been made to make the society healthier and safer. In contrast with these great efforts of institutions from all layers and sectors of the society, a strong feeling of vulnerability has been developed. In a system of participative democracy, involving the public is indispensable. That is the reason why governments are trying to establish effective risk communication strategies which have to provide a solution for the problem of the trust crisis. In many ways, experts and lay people are united. In western societies, this will primarily happen by means of the media. Governments will not always do the talking, but they will try to communicate and convince in an indirect way. Slovic, however, is convinced that risk communication has had no direct, significant impact on the closure of the gap between technical risk estimates and the public perceptions. This limited efficiency has its roots in the lack of trust. He postulates that trust is a more crucial factor in resolving conflict than risk communication as such. Slovic also laid the foundation of the trust asymmetry principle: the fact that trust is more easily to be destroyed than to be created.

4.4. Trust asymmetry principle and the value similarity approach

Many scholars have scrutinized the trust asymmetric principle in various risk context (G. Cvetkovich, Siegrist, Murray, & Tragesser, 2002; Wouter Poortinga & Pidgeon, 2004; M. P. White & Richard Eiser, 2005)

Slovic initiated the concept of trust asymmetry in 1993 (Slovic, 1993). He investigated the effects on attributions of trust of learning about different events occurring at nuclear power plants. He concluded that trust and distrust vary very strongly in the way they are created and sustained. His empirical data showed that negative events had a much stronger effect on decreasing trust than positive events did on increasing low trust levels. So trust is much

easier to destroy than to create. Also Taylor had already provided some fundamentals for this principle (S. E. Taylor, 1991). The trust asymmetry principle depicts the fragility of trust. The shift to distrust is easier made because of the following reasons:

- Negative information is more informative or diagnostic than positive information (Wouter Poortinga & Pidgeon, 2004; M. Siegrist & Cvetkovich, 2001; Skowronski & Carlston, 1989). Poortinga and Pidgeon give the following example: if someone has acted in a trustworthy way, people will not automatically assume that this person will always act like this. However, if this same person has cheated or betrayed someone, people will assume that the cheater is definitely untrustworthy (Wouter Poortinga & Pidgeon, 2004). Poortinga and Pidgeon have empirically proven that the assumption that negative information is more informative than positive information is primarily true for undecided individuals.
- Negative information is proclaimed to be less ambiguous and unclear than positive information as positive information is very often the mere absence of negative information (P. White, Pahl, Buehner, & Haye, 2003). White et al. confirm that in most cases, negative information offers much more certainty. They labeled this as the 'extremity bias'.
- Negative events are more visible and gain more attention than positive events. Invisible and undefined events will play a minor role in the construction of opinions and attitudes. Within this process, the media play a crucial role. In this context, we primarily focus on the criteria that play in the news selection process.
- Negative events have more impact and people attach more value to negative information than to positive (M. Siegrist & Cvetkovich, 2001). These scholars have also proven that sources that diffuse negative information are perceived as being more credible than sources that diffuse positive information. This principle is called the 'negativity bias'.
- Besides the extremity and negativity bias, we should also take into account the confirmatory bias, referring to the fact that negative information may confirm past negative experiences of initial negative attitudes towards a certain person, institution or situation. This involves the role of prior beliefs (P. White et al., 2003). This bias is in line with social cognition studies that have indicated that people select and interpret social information in order to support their existing worldviews (Wouter Poortinga & Pidgeon, 2004).

Initial distrust initiates the process of continuance and amplification of distrust as such, as it is a kind of self-fulfilling prophecy. When people distrust a source, they will no longer be tempted to consult this source and look for elements that support trust and credibility. Besides, the negative perspective will bias any other flow of information so that eventually, the selection and interpretation of information will be influenced. We could state that people feel the need for a reliable information broker that diffuses a sufficient amount of

trustworthy information. Within this lays the opportunity for governments to become risk communicators as they have access to the most reliable information about potential risks.
In contrast with the 'trust asymmetry principle' is the 'value similarity approach' that was defined by Earle and Cvetkovich in 1995. According to these academics, the trust asymmetry principle overlooks the fact that people do not always have the time, cognitive resources or willingness to invest in the continuous process of reevaluating and adapting their ideas about others and modifying their trust levels (G. Cvetkovich et al., 2002). They added an affective dimensions and state that *"trust is an affective social bond that is often based on general agreement and sympathy rather than on carefully reasoned arguments or indirect evidence"* (Wouter Poortinga & Pidgeon, 2004 p.1476). They assume that, when a person acquires new information, they will not adapt their trust judgments as this sort of time and effort consuming assessment is too cognitively costly and it would waste the psychological advantages of trust (as this is meant to be complexity-reducing and less intensive). So the alternative that Earle and Cvetkovich propose, the principle of perceived value similarity is based on the principle that people construct their own perceived trust levels more intuitively, basing themselves on the shared social identities or shared parallel understanding of a specific situation. We can compare this mechanism with the experiential mode of risk perception (Paul Slovic et al., 2004). The experiential mode is an academic elucidation for the observation that people construct their own risk perceptions intuitively and emotionally-driven. As Slovic states, the experiential mode is dominated by emotional responses to information about risk: *"intuition, instinct and gut feeling"* (P. Slovic, M.L. Finucane, E. Peters, & D.G. MacGregor, 2004 p.311). We will discuss the affective versus rational construction of risk perceptions and processing of risk information in chapter four (2.4).
Covello also integrated the trust issue in many of his papers (V. T. Covello & Peters, 1994; V. T. Covello et al., 2001b; R. Peters et al., 1997a; R. G. Peters, Covello, & McCallum, 1998b). He gave several factors that undermine public trust and confidence in industry and government (T. C. Covello, 1989a).

- The first bundle of obstacles relates to public perceptions that the industry protect their own interests and try to influence governmental institutes, that risk managers and governmental agents are not competent and lack technical expertise, that there is a general mismanagement of health and environmental protection programs and that experts and officials have mislead the public by providing false, incomplete and misleading information.

Covello also summarizes some concrete factors.

- The fact that risk assessment experts, risk managers and governmental agencies have disagreed and even taken diametrically opposed positions about risk assessments and that these disagreements were highly visible lead to a serious dent in the trust and credibility of these agencies and experts.
- There is a lack of resources for risk assessment and management. This lack makes it impossible to meet the demands and needs for action by citizens and interest groups

that want to be involved in decision making or problems solving processes. The lack of adequate coordination among all agencies and institutes that are involved in and responsible for the risk management process does not support a strong and trustworthy image. This deficiency in coordination is not only located in the area of risk assessment but also on the level of risk communication management. Contradictory or deviating risk communication flows, arising from various sources that claim the knowledgeable status of risk managers, do not reflect a strong and coherent risk communication policy. It only stimulates communal anxiety and social distrust. What people encounter is a very fragmented risk information pool, with too much information, coming from too many and often unknown sources, making it impossible for citizens to distract the correct information that comes up to their specific information needs.

- A fourth factor is the lack of concrete communication skills of government officials. These spokesmen were often not trained to communicate with the general public in a comprehensible and non-technical language. However, more and more organizations and governmental institutes are conscious of the importance of a good PR or communication department and try to attract competent and trained staff. They have come up to the need to use trained (risk) communicators or experts, depending of the nature of the risk context and the need for specific information.
- The last factor is the insensitivity of governments and industry officials to the specific information needs and concerns of the public.
- Other authors add the importance of public information and participation as crucial elements for the success of the risk management decision process. Even if distrust levels are high, the involvement of the public and other interest groups in the policy-making process can increase public trust in policy makers (George Cvetkovich & Löfstedt, 1999; Gambetta, 1988; Löfstedt, 2005; Misztal, 1996). A lack of public participation may undermine the general trust and confidence in the legally constituted organs of the society (Ahearne, 1990; Burton, 1989).

To summarize, as mentioned before, there is a strong need to develop detailed and process-based risk communication strategies that are not generic but rather customized to the specific requirements of each specific risk context. Public involvement is the second cornerstone of effective risk communication strategies. By taking into account these two basic conditions, both short term objectives such as lowering levels of public concern and raising levels of communal preparedness as long term objectives such as building trust and increasing confidence levels can be achieved. Also the general credibility of the government as information broker will benefit from it. The following section will point out the differences between credibility and trust.

4.5. Trust and credibility

Trust and credibility are very closely related, often considered synonyms and used interchangeably or even joined together as one concept (L. J. Frewer et al., 1996;

Jungermann, Pfister, & Fischer, 1995; R. Peters et al., 1997a). It has been proclaimed as a challenge in (risk) communication research to explicate and differentiate the concepts of trust and credibility (West, 1994). However, we did not find many scholars that have pointed out the differences between the two concepts. On the contrary, many scholars use both terms as synonyms.

However, we consider both concepts to differ from each other. Renn and Levine have pointed out a very important difference of trust with confidence: *"confidence denotes the subjective expectation of receiving trustworthy information from a person or an institution"* (Renn & Levine, 1991 p.179). They think that confidence in a source is a more enduring experience of trustworthiness over time. It is the sum of experiences of trust on a longer term. If the confidence in a certain source is shared by many persons, they state that this source is granted credibility by this group of people. They define credibility as *"the degree of shared and generalized confidence in a person or institution based on their perceived performance record of trustworthiness"* (Renn & Levine, 1991 p.179).

We define credibility as the perceived trustworthiness of the source and the message, which is usually based on the generalized confidence in the source. We consider trust as a personally perceived level of confidence in an institution, which is gained over a longer period of time and based on the perceived performance record of trustworthiness or reputation of the institution. Credibility is a short term concept that can also be attached to messages and information. One may have trust in the source, the source may be perceived as being credible as well, but the message or the information that is being diffused can only be credible.

The perceived reliability of the message and credibility of the source also plays a crucial role in the process of changing beliefs and behavioural intentions of people. Various authors have formulated that the degree in which beliefs can be changed depends on the conviction with which prior beliefs are held, the degree to which the signal can be interpreted as requiring a shift in beliefs and the perceived reliability and the credibility of the message and the source that has diffused the message (Icek Ajzen & Fishbein, 1975; Eagly & Himmelfarb, 1978; Green, 1990 p. 42). So the latter is certainly a very elementary concept to take into account when creating effective risk communication messages that will have to change beliefs and even induce certain behavioural intentions. Keywords that are associated with credibility are *"openness, accuracy, trustworthiness, impartiality and completeness of information provided to citizens"* (McComas & Trumbo, 2003 p.180)

McComas and Trumbo have used the classification of Infante, Rancer and Womack to devide credibility research into three categories: factor, functionalist and constructivist research (McComas & Trumbo, 2001 p.468).

The factor category involves source credibility research that assesses how message receivers, the public, asses various factors that may intervene in the interaction between sender and receiver. We could compare this sort of viewpoint with the efforts to define the underlying components of trust, as discussed in this chapter previously (4.1). The number of

factors and their nature vary strongly. The following table provides an overview of three scholars that defined some factors of credibility.

Source	Factors of credibility
Berlo et al. (Berlo, Lemert, & Mertz, 1969)	Competence Trustworthiness Dynamism
Whitehead (Whitehead, 1968)	Competence Trustworthiness Dynamism Objectivity
Meyer (Meyer, 1988)	Source is watching out for the receivers' interest Concern for the community's well-being Patriotic Concerned about public interests

Table 21: Overview of factors of credibility

There are three main critiques on the factor approach of studying credibility: the first question one might pose is whether listing dimensions and factors really adds to in depth comprehension of the concept of credibility and the second critique is that there is no transparency about which factors are more crucial and whether all factors are involved in the source assessment process. The last critique has a methodological nature: the outcome of the factor analysis that is used to reveal the dimensions of credibility in quantitative data analysis may vary strongly, depending on the specific method of analysis that is used (McComas & Trumbo, 2001). We can also add that there is no clear distinction with the concept of trust and the dimensions that were formulated by several authors. Some dimensions, such as competence and objectivity, are also dimensions that were characterizing for trust. This leads to a certain ambiguity concerning both concepts of trust and credibility.

The second classification of credibility research is the functional model. This perspective involves the various functions that sources may have in specific contexts and with various sorts of public. In this approach, source credibility is related to the degree in which the source satisfies the particular needs of the different groups of receivers in specific situations or in our field of interest, in the various risk contexts. The central premise is that, the more the needs of the receivers are met, the higher the source credibility will be. The question raises whether the functional model will explain and elucidate the concept of source credibility more deeply (McComas & Trumbo, 2001). We think that this second approach is more holistic as it incorporates more elements of the communication process. Besides the characteristics of the source and receivers, also the specific needs are taken into consideration. These needs can vary strongly according to the specific (risk) context. We absolutely agree with the premise that the various types of receivers should be scrutinized and their specific needs should be defined in order to choose the most appropriate source

and the most effective communication style, elements that will increase the general credibility of both the source as the message.

The last approach is the constructivist model. This is probably the most abstract approach. It contends that people use their personal constructs of reality to assess source credibility (McComas & Trumbo, 2001 p.469). Scholars that use this approach scrutinize amongst others the assumption that people will assess and judge the sources differently in different contexts and whether the evaluation criteria vary by situation. McComas and Trumbo use the study of Delia et al. to establish support for the constructivist approach (Delia, Crockett, Press, & Okeefe, 1975 in McComas and Trumbo 2001). Their research indicated that the generalized evaluations were subordinate to context-relevant beliefs and perceptions in the evaluation and attitude construction process towards the source. As McComas and Trumbo also mention that the constructivist approach has inspired many scholars. One of them is Wynne, who plead for the holistic approach of scrutinizing trust and credibility and their mutual relationship, taking into account the specific and personal constructs of the individual (B Wynne, 1992). Wynne also especially highlighted the importance of the social relationships between individuals as they perceive themselves upon other individuals, institutions and organizations. We might state that trust and credibility are socially constructed.

A last valuable concept is the principle of credibility transference. This theorem pones that lower credible sources take on the credibility of the highest credible source that agrees with its position on a (risk) issue. Surveys, mentioned by Covello, have indicated several organizations and individuals that have relatively medium to high credibility on various risk issues: health professionals, (doctors, pharmacists, …), educators, professional scientific and engineering organizations, non-management employees, non-profit organizations, environmental activist groups (often citizens), the media and local citizens who are respected, neutral and informed. We would like to stress the latter two groups: the media and the local citizens with specific traits that allow us to label them ‘opinion leaders’.

The first remark we want to make is on the media. ‘The media’ is a label that reconciles many mass media such as television, radio, but also internet. The internet creates possibilities and interaction platforms that allow interpersonal communication as well as communication to larger groups, just think about the various forums, blogs, social networking sites etc. that allow people to create contents and disperse this content to many users.

The second remark is with regard to these individuals that are respected, neutral and informed. These characteristics are some of the traits that we allocate to opinion leaders, which we will describe in detail in chapter four (3.7). We will put great emphasis on the importance of interpersonal communication and the effect of opinion leaders in the social construction of communal risk perceptions. The fact that Covello also indicates these individuals as credible sources of information that may increase general trust and credibility is a confirmation of our opinion leadership concept.

In the end, a good coordination, collaboration and two-way dialogue between all of these important groups (both organizations as individuals), will substantially deliver contributions to the enhancement of trust and credibility.

4.5.1. Credibility of opinion leaders

As mentioned previously, honesty is a crucial trait when building trust. On the contrary, when the public perceives the sources to have a hidden agenda or to act out of self – interest, credibility levels of both the source and the disseminated information drop. When the source is perceived to be unbiased and acting out of the community's interest, trust and credibility may raise (L. J. Frewer et al., 1996; R. Peters et al., 1997a; Renn & Levine, 1991). It is also generally assumed and even empirically proven that familiarity with the source influences the perceived credibility of the information (Fessenden-Raden, Fitchen, & Heath, 1987; R.E. Kasperson et al., 1992). As far as the expertise, competence and knowledge traits concerns, they are not always facilitating trust and credibility. Some stated that in certain risk contexts, e.g. technological risks, sources that are perceived to be most knowledgeable and possess most expertise are not always trusted, whereas unofficial messengers are accorded greater credibility (Fessenden-Raden et al., 1987). Among those unofficial information agents they account social networks, personal networks and opinion leaders. The media are far more complex and fickle to scrutinize. Even though the various media sources are probably the most omnipresent and important risk information diffusers, their levels of credibility (both credibility as a source as credibility of the information they are diffusing) are much more instable and uncertain. They are certainly mistrusted and people often reproach them for being subjective, for sensationalizing stories that have greater news value or for acting out of self-interest. Opinion leaders are to a certain extend perceived as experts in the personal environments of people. As we will discuss in the next chapter, opinion leaders extensively seek information about the topic (risk information) and they communicate about it. They fulfill the role of local experts who communicate interpersonally. Naturally, the genuine 'experts', who are set on stage by official authorities to communicate about their specific expertise probably still remain the most important and most credible information sources.

4.6. Experts as credible information sources

Governments have always appealed to experts to inform the public about certain risks. In the eyes of the public, the expert examined the risk, made objective judgments and calculated the probabilities. As a result, the expert would pronounce a certain situation as safe or unsafe (Davies et al., 1987b) and provide clear instructions about how to protect oneself in case of aggravation. Mostly, the majority of the people were satisfied with this information and they relied on the expert, even though there was only little concrete information available. Most risk communicators think that this general approach is not

suited anymore as a foundation to build solid risk communication strategies. Davies et al. (1987b) state that this approach has become inadequate for three reasons:
First, the change in the nature of the "new" risks that we are confronted with in the risk society plays a very important role in the construct that risks are no longer that easily quantified, predicted and controlled. The experts' judgments remain important, but their credibility has decreased as they cannot control nor estimate these new risks with as much certainty as before. It has also become very difficult for them to draft clear and unambiguous guidelines as in some situations it is very hard to predict how the risk can be controlled, both in terms of exposure as in terms of crisis control.
Secondly, the public has changed as well since they are better informed and less tolerant of risks. The unlimited access to an immense pool of information through a various and growing number of sources has created the possibility for lay people to become more informed. Of course, it is not always the case that they become better informed. People can be directly or indirectly confronted with information that is incorrect and that is aimed at creating certain risk perceptions that are to the advantage of the sources that disseminate this information. This untransparency of risk information brokers has created a general culture of distrust towards all risk information sources as the public thinks that these sources are pursuing institutional or political interests of their own.
The governments and especially the perceptions about the governments have changed particularly in terms of their openness and responsiveness. So their role as a risk regulator has been extended with the role as a risk communicator.
We may conclude that the use of experts as spokesmen is still recommended as they are still perceived to be information agents with the competence, qualification and authority to diffuse information about certain risk situations. However, there is an important shift in the roles of governments. Of course, as the data of our empirical studies will confirm (empirical body), governments should primarily fulfill their role as risk regulators: protecting civilians against life- and population threatening risks by implementing sufficient solid safety measures. As mentioned before, the changes in risk profiles, public profiles and expectations about the government as an information broker have induced the need for governments to grow into the role of risk communicators.

4.7. Importance of source credibility

We can state that credible sources are more effective than non-credible sources and that the appraised credibility of the information sources determines the effectiveness of the risk communication efforts for a great deal (Wiegman & Gutteling, 1995).
Rowan has stated that source credibility must be *"grounded on sharing power with the public"* (F. Rowan, 1996 p.28). Manipulative approaches, even when not primarily intended, strongly undermine the credibility of the source. When the source aligns the risk message to the specific needs of the public, showing their commitment and addressing the specific concerns such as certain fears or arousals, the credibility of the source and the information

will increase. As mentioned previously, the empowerment of the people starts with providing them with sufficient and especially tailor-made risk information. In order to do so, policymakers and risk managers should involve the public in the two-way interactive risk debate. As Rowan states, experts should understand public concerns (*pathos*), express a commitment in dialogue and power sharing (*ethos*), and develop accurate risk assessment information (*logos*) (F. Rowan, 1996 p.28).
According to McGuire, source credibility consists of two main components: expertise and reliability. The expertise of the source refers to the perceived know-how and the reliability of the source relates more to the perceived intentions of the source to manipulate the public and to act from self-interest (W. J. McGuire, 1968). When the source is perceived to be acting from self-interest, his reliability decreases (Eagly, Wood, & Chaiken, 1978).

5. The role of trust in policy support

5.1. Trust, credibility and risk perception

There are several empirical studies that scrutinize the relationship between credibility, trust (both trust in persons as in institutions) and risk perception (Bord & Oconnor, 1992; J. Flynn, Burns, Mertz, & Slovic, 1992; M. Siegrist, 1999, 2000; Trumbo & McComas, 2003). Trumbo and McComas have combined the perspectives of the psychometric model of risk perception, the heuristic-systematic information processing model of Eagly and Chaiken and Meyer's credibility index to answer the following question: 'To what degree does source credibility express its effect on risk perception through mechanisms of information processing?' (Trumbo & McComas, 2003). They assumed that the mechanisms linking credibility, information processing and risk perception are very likely to be located in motivation, issue involvement, information-holding and the effect of message cues (p.346). From their empirical analysis, they concluded that a great deal of the effect of credibility on risk perception is direct, rather than transmitted through information processing. They constructed a new premise that speculated about possible underlying mechanisms for this effect:
"The manner in which information moves from the original source to the individual information processor may call for an additional layer of intervening variables: at the very least an examination of the traditional dichotomy of mediated versus interpersonal channels" (Trumbo & McComas, 2003 p.351).
They suggest that both mediated information channels as interpersonal communication flows may play an important role in the risk information processing and the construction of risk perception. Siegrist has empirically proven with several studies and within various technology - related risk contexts, that people who have trust in specific companies and scientists had lower perceived risk levels and associated more benefits with the technology than people with lower trust levels (Earle & Siegrist, 2008; M. Siegrist, 1999, 2000, 2008; M. Siegrist, Cousin, Kastenholz, & Wiek, 2007). Results further suggest that social trust in the

industry is an important factor directly influencing the affect evoked by the new products and the potential risks they bring. As suggested by the affect heuristic, affect had an impact on perceived benefits and perceived risks. Also Siegrist et al. scrutinized the relationship between trust and perceived risk levels. They concluded that high levels of trust and confidence reduce perceived risk levels (M. Siegrist et al., 2005). Other scholars have scrutinized the presence and strength of associations between trust and risk indices based on risk assessments of various hazards (Greenberg & Williams, 1999; Svetkovich, 1999).
In the face of opaque risks, trust is even more important as various studies point out that trust is vital in when there is lack of knowledge about the risk (Luhmann, 1973). A lack of knowledge about the risk can rise because of the complexity of specific risks, for instance the complexity of nuclear risks or risks related to gene technology. People may rely on social trust to cope with this lack of knowledge and to reduce the complexity of the information they are faced with (M. Siegrist & Cvetkovich, 2000). Besides complex risk information as a drive to rely on trust, also the absence of knowledge, certainty and probability estimates in certain risk contexts may influence the role of trust, both trust as a form of confidence in the risk regulators that have to assess and manage the specific risk as trust in the institutes and organizations that play a major role in the origin and development of the risks. Especially in these uncertain risk situations, people need to have trust in the institutions that may have an important impact in the risk assessment and management process. Support for governmental initiatives is also very crucial factor that may influence the effectiveness of the risk management strategies that have to be implemented as the public is more and more involved in the risk debates and risk decision making processes.

5.2. Trust and public support for policy decisions in the context of risk

Gerber and Neely have pointed out four main factors, besides direct or indirect socio - demographical influences, that influence individuals' preferences for government action to address various hazards (B. Gerber & G. Neeley, 2005 p.398). They have formulated six hypotheses about the relationship between these factors and the public support for governmental initiatives (B. Gerber & G. Neeley, 2005 p.398-399).
They firstly expressed their perceptions about trust, both in terms of general trust in the government as a risk regulator as trust in the expertise and competence of public officials and scientists. They use the theoretical grounds of various scholars to point out that trust in the government is critical to individuals' ratings of various potential hazards which have policy implications (R.E. Kasperson et al., 1992; M. Siegrist & Cvetkovich, 2001; L. Sjoberg, 2001). The first hypothesis is as follows:

(H1) As trust in government increases, support for government intervention to address a hazard should increase.

For the first factor that influences the public support for a governmental intervention, Gerber and Neeley make a distinction between general trust in the government and perceptions of governmental or scientific competence and expertise, two traits that are essential to tackle specific risks. That is why they formulated a second hypothesis:

(H2) As confidence in government or scientific policy competence increases, citizens' support for government intervention to address a hazard will increase.

Gerber and Neeley also integrated political ideology as a key determinant of risk perception, as scrutinized and discussed by Douglas and Wildavsky (Douglas & Wildavsky, 1983) and as a concept that is closely related to individuals' preferences for governmental action to address a certain hazardous issue. They assumed the following relationship:

(H3) As ideology liberates, support for governmental intervention to address a hazard will increase.

The third factor that they use to explain policy preferences is based on the relationship between the personally perceived importance of a policy issue and the individual's perceived risk in a particular risk context (Slovic, 1987). They stated the fourth hypothesis as follows:

(H4) As issue awareness increases, support for governmental intervention to address a hazard will increase.

The role of the perceived risk itself is proposed as the final element that influences preferences for government action. They specify the perceived risk by mentioning that there are three dimensions that relate specifically to public policy preferences: personal risk, community risk and risk magnification in the future. They have developed two hypotheses that integrate these dimensions:

(H5) As the perception of future hazard severity increases, support for governmental intervention to address the hazard will increase.

(H6) As ratings of personal and community risk associated with a hazard increase, support for governmental intervention to deal with that hazard will increase.

However, the authors also mention that this relationship between perceived risk and the attitude towards government policy making is rather fragile in opaque risk contexts, characterized by a lack of concrete knowledge about the risk (B. J. Gerber & G. W. Neeley, 2005).
A general agreement among risk studies was accomplished by scrutinizing the opinions and the expectations about high potential hazards with high consequences. The common

findings of this kind of studies have a limited transferability when it comes to the specific question how risk perceptions influence public policy support. Gerber and Neeley formulate two reasons for this limited transferability. The first reason is methodological. To be able to estimate the effects of perceived risks, risk managers should consider that the determinants for policy support are linked to the perceptions of the risks: *"those factors that predict policy preferences (general political attitudes such as ideology) also predict perceived risk, resulting in endogeneity among explanatory variables"* (B. Gerber & G. Neeley, 2005 p.397). Therefore, separating out the effects of perceived risk is necessary to accurately account for the role risk plays in attitudes toward government policy actions. The second reason includes that the generalizability of inferences of studies of high risk situations could be limited because of the fact that the attitudes of civilians towards more controversial policy issues are not applicable to the attitudes towards more acquainted risk situations. The familiarity of the risk situation depends on the level of experience with the risk, the proximity of the risk, the level of knowledge that the individual possesses about the risk etc. Gerber and Neeley use the example of air pollution. Individuals who live in areas with poor air quality will have more outspoken opinions and will support governmental policy decisions that will try to solve the air pollution problems more when they perceive the risk to be harmful for their personal health. On the other hand, the attitudes of these individuals towards more unfamiliar risk situations may be very different.

According to Pollak (1996), the limitations of scientific knowledge about certain risks, combined with the lack of public trust in the governments and experts has introduced the need to create specialized competence centers that have as a primary objective to restore the public trust in governmental institutes and their risk management efforts.

"The inadequacy of scientific knowledge, coupled with the lack of public trust in government and in experts, suggests that risk regulators should be concerned not only with creating institutional arrangements likely to foster trust but also with creating mechanisms for providing concerned individuals with credible reassurance" (Pollak, 1996 p.25)

The article concludes by discussing divergences between public perceptions and expert perceptions of risks, and the weights that a democratic society should give to each in assessing and managing risks.

5.3. Involving the public and crossing bridges between experts and lay

The role of the public as active participants in the risk communication and even risk management processes has been confirmed previously. In the light of trust and credibility, effective risk communication is also a key factor in developing, correcting and maintaining public confidence (Brown, 1990). Governments and risk managers in general should start by recognizing the complex and delicate nature of the communication process that incorporates several cultural, social and psychosocial constructs. One of the key challenges is to cross the bridges between expert convictions that are based on raw and quantitative data (which is not always applicable in opaque risk situations) and public perceptions and

opinions that are even more complex, divers and sometimes even conflicting. Only by crossing those bridges, that sometimes have yet to be constructed, public trust and confidence in professional communities and public institutions will be stimulated and maintained (Smith & McCloskey, 1998). Bier states that risk decision making processes, risk management and risk communication strategies should be developed to function in a general atmosphere of distrust as well (Bier, 2001). This has several implications on the tangible strategy development. First of all, Bier suggests to listen to the public before providing them new information. It could also be constructive to involve the public as passive supervisors. The last and most intensive proposal of Bier is to involve the public directly into the risk decision making process. In case of this condition of direct participation, people will not have to rely on their general confidence and trust in the policy makers or authorities because they have the (perceived) possibility to influence the direction, the development or even the outcomes of certain decision processes themselves.

5.4. Targeting communications

We already explained comprehensively why al risk communication efforts should be public oriented and target-based (chapter two). We have concluded that there is no average 'member of the public', especially in the context of risk perception and risk communication. We will also confirm this empirically in our research reports. Based on the specific audience profiles (both demographical as media profiles), we will be able to construct customized messages, choose the most appropriate communication channels and offer the most appropriate interactive communication platforms for feedback and input for the cooperative risk management process. We also want to emphasize the fact that information needs can change, so that we should try to monitor these needs over time. The proposed methodology will offer the tools to monitor these needs and to gain knowledge about the specific audience profiles in a given risk context.
A lot of the manuals and guidelines that have been developed for governmental institutes by specialized communication agencies stress the importance of communicating receiver oriented and scrutinizing public perceptions as vital elements in risk management and risk communication practices. Some examples of these manuals are summarized in the table below.

Manual / Guidelines	Author
Code of Practice for Scientific Advisory Committee	(Government Office for Science, 2007)
Communicating in a crisis: Risk communication guidelines for public officials	(U.S. Department of Health Services, 2002)
Communicating Risk	(GICS) UK Resilience Center
Viewfinder: a policy maker's guide to public involvement	(Cabinet Office)
Crisis and Emergency Risk Communication. Pandemic	(Reynolds, 2007) for Centers for Disease

Influenza	Control and Prevention
Strategic Risk Communications Framework	(Health Canada, 2006 and the Public Health Agency of Canada)
De acceptatie voorbij. Risico en Crisiscommunicatie met een mondige samenleving	(Jong & Helsloot, 2005) for the Expertisecentrum Risico en Crisiscommunicatie
Effective Media Communication during Public Health Emergencies. A who field guide.	(Hyer & Covello, 2005) for the World Health Organization
Crisis and emergency risk communication: By leaders for leaders.	(Reynolds, 2004) for Centers for Disease Control and Prevention
Effective Risk Communication. The Nuclear Regulatory Commission's Guidelines for External Risk Communication	(Persensky et al., 2004) for the United States Nuclear Regulatory Commission
Tools for Development. A handbook for those engaged in development activity	(Dearden, Jones, & Sartorius, 2003) for the Performance and Effectiveness Department Department for International Development
Crisis and Emergency Risk Communication	(Reynolds, 2002) for Centers for Disease Control and Prevention
Communication in risk situations. Responding to the communication challenges posed by bioterrorism and emerging infectious diseases	(V.T. Covello, 2002)
Risk Communication. A Guide to Regulatory Practice	(ILGRA, 1998)

Table 22: Overview of official manuals and guidelines for effective risk communication

The summarized manuals and guidelines are developed mainly by governmental institutions in cooperation with field experts and academics that are specialized in risk communication. These manuals are included as appendices on the CD - rom.

6. Conclusion

This chapter mainly focused on the concept of public participation in risk management and governmental risk communication processes and on the importance of trust and credibility for effective risk communication practices. We started by defining several perceived roles of the government as a risk communicator. It is important to define and monitor the roles of the government as the information needs of the public and the perceived roles of the government will vary according to the specific risk contexts. The primary objectives of the governmental risk communication strategies will depend on the desired strategic outcomes of the risk managers or government officials on the one hand and on the specific information needs of the various stakeholders that are involved in the risk situation on the other hand. Depending on whether the government has to pick up an advisory, protective or redistributive role, the focus in the information strategy will be on information provision, (re)assurance or involvement. Naturally, as various stakeholders may have different

perceived roles, the government might be obliged to implement combinations of information strategies. The last role, the redistributive role, requires a stronger need for public involvement and other stakeholder participation. Many scholars have emphasized the growing interest of practitioners and researchers in stakeholder participation in risk decision processes and bottom-up participative communication processes. It is no longer the question whether an input from diverse communities and stakeholders should be solicited and incorporated that occupies academics and governmental communication experts but it is a matter of finding the right way to do so. One of the main conclusions was that trust and confidence are probably the most crucial influential elements in effective risk management processes that involve stakeholder participation. That is why we decided to describe and illustrate the concepts of trust, confidence and credibility more comprehensively. Trust is a multidimensional and complex concept. The table summarized the dimensions of trust as proclaimed by the scholars that have scrutinized trust in risk management and linked them to the classification of Peters et al. (R. Peters et al., 1997a). However, we advocate the view of Frewer et al. (1996), who defined a more differentiated approach claiming that trust is multidimensional but the specific traits are not fixed. They suggest that every information source may gain or lose trust depending on its efforts and capabilities of meeting the specific expectations of the public regarding these specific characteristics that induce trust. We also integrated the five levels of analysis of trust: the communicator, the message, credibility of the institution based on source perception, credibility of institutions based on institutional performance and climate for trust and credibility in a macro-sociological and political context. We also provided an overview of the key variables that may interact on the various levels of analysis.

We can conclude that trust is vital on all levels of analysis and that it is a primary condition to establish and implement risk communication strategies with direct impacts as well as long term effects. But when we formulate it the other way round, we can state that effective risk communication may increase trust levels and mitigate the trust crisis in governmental institutes, primarily by involving the public and stimulating two-way and bottom-up communication. Unfortunately, trust is more easily to be destroyed than to be created, as claimed by the trust asymmetry principle (Slovic, 1993). We confronted the trust asymmetry principle with the value similarity approach (G. Cvetkovich et al., 2002), which claims that people construct their own perceived trust levels more intuitively, basing themselves on the shared social identities or shared parallel understanding of a specific situation. We also defined the difference between trust and credibility. However, the concepts of trust, credibility and confidence are often used as synonyms. After having defined the concept of credibility, we discussed the importance of experts and opinion leaders as credible sources of information in risk communication strategies. Naturally, we had to link trust and credibility to risk perception. Trumbo and McComas (2003) assumed that the mechanisms linking credibility, information processing and risk perception are very likely to be located in motivation, issue involvement, information-holding and the effect of message cues (Trumbo & McComas, 2003). Trust was also defined as a crucial driver for public support for policy

decisions in the context of risk. But one of the main remarks is that this relationship between perceived risk and the attitude towards government policy making is rather fragile in opaque risk contexts, characterized by a lack of concrete knowledge about the risk (B. J. Gerber & G. W. Neeley, 2005). We concluded the chapter by emphasizing the fact that governments and risk managers in general should start by recognizing the complex and delicate nature of the risk communication process. This process incorporates several cultural, social and psychosocial constructs. Before risk managers are able to cross the bridges between experts' analytical opinions and lay people's risk perceptions, the bridges have to be constructed with tools that should be created by both players. By involving the various stakeholders as passive supervisors of the interests of their own group or even as active participants and contributors to the risk management processes, trust levels are actually becoming less important as they can influence the direction, the development or even the outcomes of certain decision processes themselves. We concluded the chapter by offering an overview of some essential guidelines and handbooks for good risk communication practice, developed by or for several governmental institutes. These guidelines and handbooks all advocate the public oriented and targeted risk communication approach. The next chapter will extensively discuss this rather new and, in our opinion, most appropriate approach for effective risk communication.

CHAPTER FOUR

TOWARDS A PUBLIC ORIENTED RISK COMMUNICATION POLICY

1. Risk communication as a multidisciplinary and multilevel process

The concept of "risk" is a multifaceted concept that involves the judgments of the individual, the group and the whole society about the factors that cause, manage, regulate and compensate for potential hazards prior to, during and after the hazards occurs. As O'Riordan formulates:

"Risk is a socially derived phenomenon within which the technical interpretation of risk as hazard multiplied by probability plays some kind of role, but only as a basis for judgment and responsiveness. Risk is essentially the cultural interpretation of hazardousness" (O'Riordan, 1990 p.294).

So besides the mathematical component of risk as the result of a proporation between probability ratios and estimated consequences, the broader concept of risk also involves the individual and social perceptions of people that are encountered with uncertainties and hazards. O'Riordan also states that risk analysis actually combines both exact sciences and social sciences. Naturally, social sciences are a very broad discipline that may scrutinize every phenomenon where humans are involved. So when we consider risk communication as an social scientific discipline, we can approach it from various levels: we may consider a cognitive, motivational and emotional level from a psychological point of view (LeeAnn Kahlor, Dunwoody, Griffin, Neuwirth, & Giese, 2003; Marks, 1990; M. Siegrist et al., 2005; Tversky & Kahneman, 1974) and of course various approaches from socio psychological and sociological viewpoints (R. E. Kasperson & Kasperson, 1996; Wildavsky & Douglas, 1983).
Even Paul Slovic, one of the founders of the pure psychologically inspired psychometric paradigm, stated in his contribution to Krimsky's and Golding's Social Theories of Risk:

"It is most certainly the case that information processing (cognition), personality, social factors, economic factors and cultural factors interact to determine individual and societal response to risk." (Slovic, 1992 p.149)

This citation indicates that the concept of risk is multi-faceted and that it can, both theoretically as empirically, be approached by multiple academic disciplines. Moreover, as Slovic states, the most ideal approach is a combination of these disciplines. We believe it is absolutely necessary to integrate theoretical perspectives that discuss risk perception and

risk information processing on the psychological, socio psychological and sociological level as the process of risk communication extends from the individual risk perception and information processing to the social construction of risks and the risk information exchange processes within an entire community and society. That is why we will divide this chapter into two main components. Within the first component we will try to reconcile several frameworks that involve individual risk perception risk information seeking and risk information processing. The second component will discuss risk as a socially constructed concept and the role of interpersonal communication and opinion leadership in the social construction of communal risk perceptions.

In order to construct effective risk communication strategies, it is absolutely necessary to scrutinize the public, unveil their beliefs, risk perception levels, behavioural intentions, information needs etc. This receiver centered approach has been advocated by various scholars (Davies et al., 1987b; Green, 1990; Handmer & Penning-Rowsell, 1990; C. Wilson, 1990). Bier has stated that it is of crucial importance to reveal the specific characteristics of the public (Bier, 2001): their level of education and knowledge about the specific situation or context, their attitudes and convictions about the topic, their level of openness and susceptibility for information and ideas that are diffused, their involvement and concern about the topic. In order to obtain this kind of information, scholars may opt for several research designs, both of qualitative as quantitative nature: focus groups, survey research, interviews etc. Bier also stressed the importance of socio - demographic and socio - economical differences as differentiating elements for creating target oriented risk communication strategies.

We will now quote some important scholars that have indicated the importance of a public oriented approach of risk communication.

> *"(…) effective communication involves taking a "receiver-centered" approach, and until the communicator stands in the psychological and perceptual position of the receiver, effective transfer of information and ideas will not occur" (C. Wilson, 1990 p.61).*

> *"The frequent, enormous differences between the senders and recipients of risk communication messages highlight the need to tailor messages to the target audience" (Handmer & Penning-Rowsell, 1990 p.131)*

> *"We have to think very carefully about what we mean by the public if we are really going to get at the question of how to communicate with the public" A. Alms (Davies et al., 1987b p.50)*

> *"To design an effective risk communication system it is first necessary to determine what beliefs and expectations the target population holds about the hazard, and their consequent behavioural intentions" (Green, 1990 p.31)*

The quotes contain both elements about the individual nature of the elements of a community (individuals) as elements that refer to the public as an entity of socially interacting elements. However, we cannot consider 'the public' as a homogeneous entity of elements (individuals). We can consider the public as the sum of various groups of stakeholders but also as the sum of individuals that can be grouped according to specific socio-demographical traits, media profiles and risk perceptions. These individual and group-based perceptions represent one component in the dual structure of risk. Sandman labeled this part of risk as the outrage component. Sandman created the 'outrage mode', probably the most simple and concise model to define risk (P. Sandman, 1988). The formula consists of three components: hazard and outrage.

Risk = Hazard + Outrage

This implies that risk has a dual nature: one component can be scientifically and technically calculated but the other component is far more complex and ambiguous. The outrage component depends mostly on a multitude of intuitive and emotional factors (V. Covello & Sandman, 2001a). The most important components of this outrage dimension are voluntariness, controllability, honesty, trust, fear and the acquaintance with the risk. Some scholars also refer to a 'residual risk' component. The residual risk is "the risk that remains after the society has expended all the resources it can afford for purposes of control" (Davies et al., 1987b p.22). We might pose that the residual share in 'new' and untransparent risks is larger than with the more traditional risks that can be calculated and controlled more easily. This combination of definitions of risk by Sandman on the one hand and residual risk of Davies et al. on the other hand illustrate that risk management and risk perception should be dealt with on both the level of the individual, as a rational and emotional being, as on the level of the community.
The social cognitive theory of Bandura is a perfect introductory framework to this chapter as it introduces the interplay of elements on the individual or psychological level, elements that refer to social interaction and environmental influential elements.

1.1. The social cognitive theory

Bandura states that the social cognitive theory is concerned with exploring the social diffusion of new styles of behaviour, integrating the interplay of social and cognitive factors and how both of them shape behaviour (Bandura, 2001).

"Social cognitive theory provides an agentic conceptual framework within which to analyze the determinants and psychosocial mechanisms through which symbolic communication influences human thought, affect and action." (Bandura, 2001 p.265).

The viewpoint of this theory is based on “triadic reciprocal causation” in which there is a bi-directional interaction between behaviour, environmental factors and intrapersonal factors (a.o. cognitive processes) (A. Bandura, 1986).

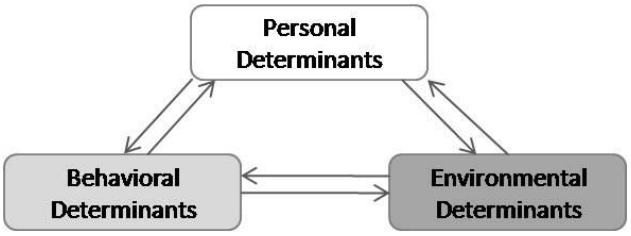


Figure 22: Triadic reciprocal causation

Within this theory, individuals are both producers as products of social systems and function as information dispersers in this context. To cite Bandura: *“Personal agency and social structure operate as co determinants in an integrated causal structure rather than, as a disembodied duality”* (Bandura, 2001 p.266).

The cognitive component focuses on the identification of the personal traits of a person that explains the variations in his or her information behaviour. The main objective is to describe the cognitive processing of information and the potential changes of the mental images (perceptions) and individual knowledge structures. It suggests that personal information behaviour *“(…) is a dynamic, constantly changing condition”* (A. Pálsdóttir, 2005 p.49). The social component will perceive persons as ‘social beings’. It will primarily analyze the social context of information behaviour. Finally, the social cognitive approach will integrate both viewpoints and analyzing perspectives. It recognizes that cognitive activities are embedded in social practices of the social system that a person lives in. However, we must add that this social system is not limited to tangible personal networks, characterized by personal contact and direct communication. Due to the rapid expansion of both the real as the virtual social sphere that a person cultivates, it is important to realize that the definition of the “social system” and consequently the “social practices of people” will change in relation to the evolving impact of the new information society and its characteristics.

So the social cognitive theory integrates two pathways for information / communication flows: a direct pathway through which the sources directly inform and motivate participants and an indirect or ‘socially mediated’ pathway that enables participants to be linked to social networks and community settings through media influences. The framework states that structural interconnectedness provides potential diffusion paths and that socio- cognitive factors largely determine what diffuses through those paths. The theory has a quite distinctive multidisciplinary approach as it reconciles individual information processes that are usually studied within the field of psychology with sociological processes. In the following paragraphs, we will also try to study the processes of risk perception and risk communication through an academic window that exists of psychological, psychosocial and

sociological layers. In the first section, we will primarily focus on the individual, the 'micro' level: the psychological processes that underlie risk perception and risk information processing.

2. Individual risk perception and behaviour

In academic literature concerning risk perception, several paradigms are identified: e.g. the axiomatic measurement paradigm, the socio-cultural paradigm and the psychometric paradigm. The axiomatic paradigm puts emphasis on the way in which people objectively transform information to a customized, subjective version that "fits" with their own life and their perceived risk environment. The socio-cultural paradigm integrates variables on the socio-economic and cultural level that may influence risk perception. Let us start with probably one of the most popular paradigms that scrutinize individual risk perception: the psychometric paradigm.

2.1. The psychometric paradigm

The psychometric paradigm is a very popular academic track to scrutinize and build knowledge about risk perception processes. The aim of the psychometric paradigm is to unveil the factors that determine risk perception and explain why people perceive various hazards differently (M. Siegrist et al., 2005). The godfathers of this paradigm are Baruch Fischhoff and colleagues in 1978. Their model pointed out the involvement of feelings and emotions with risk perception (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978). Most research about risk perception and risk communication has been guided by this approach (Slovic, 1987; Tversky & Kahneman, 1981, 1982a). The goal of risk communication in the tradition of the psychometric paradigm is to close the gap between public, lay risk perceptions and expert risk assessments so that the individuals are able to take rationally informed choices and decisions (Slavin et al., 2008). However, many scholars have indicated that this 'logical' reasoning about risk communication and about 'closing the gap' is very difficult as the public seems to be very persevered in their emotionally-driven, intuitive and seemingly 'irrational' risk perceptions, as we will discuss further in 3.4. Although the psychometric paradigm has focused mainly on developing cognitive maps for measuring perceptions, attitudes, … of individuals (M. Siegrist et al., 2005; Slovic, 1987), some scholars have claimed that the research tradition has evolved and now also includes concepts that are closely related to social and cultural values and the contexts that can be associated with risk perceptions (Sellnow et al., 2008).

For the processing of risk information and more specifically risk messages, Hamilton has introduced the concept of 'frame of acceptance' (Hamilton, 2000). The frame of acceptance refers to an "*individual's orientation that is drawn from and combines elements of larger meaning systems or orientations"* (Hamilton, 2000 p.292). This means that messages will be

selected, processed and interpreted differently by different groups of people, depending of the mental map or reference system they are consciously or unconsciously using.
Analogous to the reference system, other state that it is generally assumed that people appeal to a complex array of qualitative and quantitative factors of both conscious as unconscious nature to define, evaluate and act on information about risks (W. McGuire, 1981; Otway & Vonwinterfeldt, 1982; Slovic et al., 1980a; Slovic, Fischhoff, & Lichtenstein, 1982; Vlek & Stallen, 1981).
They have defined factors that are important in public perceptions, we extract the most important factors in the context of new and untransparent risks. The following table provides us with an overview of the factors that increase or reduce risk perceptions (T. C. Covello, 1989a; Grima, 1989).

Factors tending to increase perceived risk	Factors tending to reduce perceived risk
Catastrophic potential, scale, large number of fatalities per event	Small number of fatalities
Fatalities and consequences are groups in space and time	Fatalities and consequences are scattered or random in space and time
Unfamiliarity with the risk	Familiarity
No comprehension and understanding of risk (mechanisms and process), risk information, exposure,	Comprehension
Unfamiliar and unknown risks	Familiar risks
Uncontrollability (personal and institutional)	Controllability
Involuntary risks/consequences	Voluntary risks/consequences
High potential effects on children, future,...	Low potential effects on children, future,...
Identifiable victims whom one can identify with	Statistical, anonymous victims
Dread hazards	Common hazards
General distrust in institutions, sources	Trust in institutions, belief in sources
Biased media coverage (quantity, quality)	Correct and true media coverage
Unknown risk history (similar risks and impact of past crisis's)	Known risk history
Unclear or uncertain benefits of risk context, lack of knowledge	Knowledge, clearly understood benefits
Possible irreversible effects attached to the risk	Reversible and solvable effects
Immediate risks, degree of personal involvement, probability that personal life is affected	Latent or delayed risk
Direct	Indirect

Table 23: Factors that increase or reduce perceived risk (T. C. Covello, 1989a; Grima, 1989)

As we can deduct from the table, many of the factors that increase perceived risk are characteristics of the opaque risks that our contemporary society is confronted with. New technologies such as gene technology bring along many uncertainties and their related risks. Especially the unfamiliar, uncontrollable, unknown and involuntary traits of these risks make that our risk perceptions are high. There are however psychological mechanisms that allow possibilities to control the risk perceptions people are faced with. It is not the risk as such nor the exposure to the risk that individuals' will try to control, since this is subjectively not possible, it is the level of information about the risk that will play a crucial role in the subjective construction of the individual risk perceptions. We will discuss this locus of information and the principle of self-efficacy in 2.6.3.
Let us first take a more in-depth look at the heuristics that play a role in the process of cognitive risk perception.

2.2. Risk perception and heuristics

In the 1970's, the academic work on heuristics and probability bias judgments (Tversky, 1974; Tversky & Kahneman, 1973, 1974) was often cited as pertinent (L. Sjoberg, 1979). The three most popular heuristics are anchoring (Tversky & Kahneman, 1974), representativeness and availability (Lee Ross & Nisbett, 1980; Tversky & Kahneman, 1973, 1982a). Risk perception literature shows us that the availability heuristic is probably the most important to understand risk perception (Tversky & Kahneman, 1973). Heuristic rules are cognitive shortcuts to reduce the complexity of a decision making process. The availability heuristic emphasizes the crucial role of personal experience as a determinant of perceived risk. If a person's experiences are biased, his perceptions will be biased and deviate from the objective reality (Slovic et al., 1981). As people are exposed to many sources and information, it is logical that there are as many perceptions of the reality than there are people who are exposed to this reality. So a lot of issues are strongly mentally constructed by the information that one gathers directly or indirectly, consciously or unconsciously. The amount of information that is being spread and that reaches a person will influence the mental distance to the issue. So this may comprise that the easier we can acquire a large quantity of information about a certain risk, or the more examples we have embedded in our minds concerning a certain threat, the bigger the estimated, perceived risk will be. So people tend to have the cognitive processing reaction that the more easy something comes to one's mind, the more they think it actually happens in their direct environment (Shrum & Oguinn, 1993). Excessive communicating or putting disproportionate focus on the risk in communication outputs can lead to an enlargement of the facts. Eventually this can foster a process of addressing priority to certain risk related topics in one's personal agenda – setting process.
The heuristic systematic information processing model builds upon the fundaments of the traditional heuristics paradigm and tries to define more specifically how individuals process

information. As we will discuss in the next section, this model is adopted by many scholars in the field of risk research.

2.3. The heuristic systematic information processing model

The heuristic systematic model (HSM) integrates two modes of individual information processing: using systematic and/or heuristic strategies (Chaiken, 1980). Systematic processing of information takes place when an individual reconciles the information that he already possesses with information and arguments that he has gathered and examined carefully. The outcome is a well-considered judgment. Heuristic processing is, as we already mentioned in the previous paragraphs, a mode of information processing that involves rather simple decision rules that may reduce the complexity of an information processing, evaluation or decision making process. Both modes can be addressed simultaneously, or one mode can dominate over the other one, depending on various factors. Trumbo and McComas refer to Eagly and Chaiken, who defined two general types of processing mode determinants: cognitive and motivational (Eagly & Chaiken, 1993 in Trumbo and McComas 2003). As Trumbo and McComas state, the primary cognitive determinant of processing mode is the degree to which the individual is capable of processing information. This kind of systematic processing implies that people's abilities to process information thoroughly may vary strongly, depending on individual and situational factors (e.g. time pressure, experience, prior knowledge) and is much more demanding than heuristic information processing. Besides the cognitive mode determinant, Trumbo and McComas refer to two closely related motivational determinants: accuracy motivation and information sufficiency Chaiken et al. have added the impression motivation and defence motivation (Chaiken, Giner-Sorolla, & Chen, 1996). The most important input of the HSM is that information sufficiency is defined as a factor of judgmental confidence. When people develop certain information needs due to a lack of knowledge, their motivation can increase when information sufficiency is not achieved and the individual does not hold his personally desired level of judgmental confidence (Trumbo & McComas, 2003). This motivation can be the trigger for concrete information seeking behaviour. Especially in the context of risk, the heuristic-systematic information processing model has proven to be a very useful theoretical foundation. Various scholars have applied the model in empirical studies (Griffin, Dunwoody, & Neuwirth, 1999; Meijnders, Midden, & Wilke, 2001; Trumbo, 1999, 2002). Again, we may state that we find support in this theoretical framework that perceived risk information sufficiency may lead to confidence. We might hypothetically suggest that the locus of information control plays a vital role in building personal confidence and even reducing levels of fear.

The next paragraph will discuss an update of the psychometric paradigm as suggested by Slovic in the context of risk perception. He suggests that, besides the purely rational mode of cognition, there is also an 'experiental' system that can be addressed to construct risk perceptions (P. Slovic et al., 2004).

2.4. Risk as feelings and risk as analysis

In 2004, Slovic et al. published an article that introduced the 'experiential system' that is increasingly used to construct risk perceptions (Paul Slovic et al., 2004). Slovic et al. start from the dual-process theory that proposes a dual structure in thinking, knowing and information processing (Sloman, 1996). The theory proposes two modes of cognition: an experiential and a rational mode. The rational mode is similar as the purely psychometric viewpoint: the idea that all risk perceptions are, or should be, based on calculation, on the rules of logic, probability theory and utility maximization. It requires conscious control. The experiential mode is rather an answer or academic elucidation for the observation that the public keeps on constructing their own risk perceptions intuitively and emotionally-driven. As Slovic states, the experiential mode is dominated by emotional responses to information about risk: *"intuition, instinct and gut feeling"* (P. Slovic et al., 2004 p.311). It mostly relies on *"images and associations, linked by experience to emotion and affect"* (p.311). According to Slovic et al. (2004), this system is something that allowed the human race to survive during their evolution. It is the most natural and common way to respond to risk. Other authors are also convinced that the experiential mode is the basic, instinctive mode to process risk information. Some have found new, creative links to evolutionary psychological theories, Tucker and Ferson refer to it as 'the evolutionary anthropology of risk' (Tucker & Ferson, 2008). They state that this new perspective on risk perception and risk communication could provide communication experts with lists of specific environmental cues that activate particular mental mechanisms and result in particular perceptions and conceptions of risks.
The gap between the 'instinctive' experiential system and the 'new, industrialized' rational system could be proposed as an explanation for the differing risk perceptions of the public and the experts (Loewenstein et al., 2001; Paul Slovic et al., 2004). Anyway, most scholars that adept this view, are convinced that the analytic, rational system cannot be effective without the guidance by emotion and affect, so risk perception and the entire process of attitudes and behaviour that is triggered by risk perception is a very complex interplay between affect and reason. It is vital to take into account both components in the development process of effective risk communication strategies. Peters et al. concluded with their study that

"risk communication (about stigmatized objects) may benefit from a more complete understanding of how affective and emotional reactions are constructed and the routes through which they affect responses and behaviours" (E. M. Peters, Burraston, & Mertz, 2003 p.1349).

In their article, they also scrutinized the interaction between two psychological information processing systems: the emotional (experiential) and cognitive (rational) system. They looked at their joined influence on perceptions and acceptability of risks.

2.5. Risk perception and the media

The mass media and especially news media are a very important source of information about risks and crisis's. They are also a very appropriate channel for governments to diffuse information into the community. We could assume that because of the specific new selection and presentation processes of certain risk items, risk public perceptions may be influenced very strongly. We could also hypothesize that the mass media may potentially influence the specific behaviour of individuals as their behaviour is a consequence of their perceptions, attitudes and beliefs (Kone & Mullet, 1994; McCombs, 1992; Slovic et al., 1982). The amount of information that we encounter on a daily base in our contemporary, western information society is gaining gigantic proportions. An extensive portion of the population can be reached by a divers and comprehensive amount of communication channels. People are confronted with risk information through all sorts of media channels on a daily basis. Knowledge about certain risk situations is mainly gained by consulting the mass media directly or by being confronted with risk information indirectly. Risk information is the key component in the construction of the individual risk perception. By developing a cognitive and effective experiential system people gain the capabilities to deal with risks and crisis's successfully and survive. Even in their daily lives, parents will pass their knowledge about risks to their children. That is why it is of vital importance to gain knowledge about how individuals and also the communities they live in as a whole come to their risk perceptions and what the role of the mass media as primary sources of risk information may be. This knowledge can allow authorities to construct more solid risk management and risk communication strategies.

The idea that there is an obvious relationship between the mass media and risk perception has been discussed by various scholars in as many disciplines. The assumption that frequent media exposure gives rise to a high level of perceived risk has been accepted and denied by several empirical and theoretical studies (Freudenburg, Coleman, Gonzales, & Helgeland, 1996; Wahlberg & Sjoberg, 2000). Wählberg en Sjöberg scrutinized the impact of the media on risk perception (Wahlberg & Sjoberg, 2000).

Their study included several research items:

- The media content: they compared the content of several sources with the objective reality and tried to gain knowledge about the factors that could explain the differences in the influence of these media contents versus similar information that is diffused by other sources of information on risk perception.
- What psychological and theoretical concepts and models could explain the influence of these media contents on risk perception?
- The difference in impact between common media messages or reports versus messages that are specifically constructed and diffused by the mass media as risk communication messages.

They concluded their study by stating that, even though many take media's influence for granted, the evidence they found points the other way. They specify that, for heavy media

users, media are probably not a very strong causal factor in risk perception. In general, risk perception may be affected by the media via the availability principle, meaning that the more risk information is diffused, the higher the risk will be on the agenda and the stronger the effect will probably be. But they also state that these effects are attenuated by impersonal impact meaning that general risk perception is more easily changed than personal risk perception. The most important conclusion is that there are still many uncertainties and that it is very difficult to determine the causality and the specific path of the effect the media have on the personal and social risk perception. It is very important to reason and formulate with caution.

Other scholars have concluded that there is a substantial impact of the amount of information that people are exposed to and will have to process (Mazur & Lee, 1993). We already mentioned the availability principle. A remarkable conclusion is that also positive media contents can lead to negative emotions and reactions with the public. Public concern may rise depending on the amount of information they are confronted with about a specific risk or hazard. Some scholars also assigned an important role to the media in the process of information verification.

2.5.1. The role of the media in the process of verification

It was Bandura who posed that people's conceptions and perceptions of reality are formed through an intensive process of verification (Albert Bandura, 1986). The process includes a personal comparison between the individual's own conceptions and some 'standard of verity'. When encountered with new information about a certain risk situation, the individual will first compare it with a certain standard, which is usually based on the person's own experiences with the risk situation. When there is a lack of own, personal or even social experience, people will often base themselves on the standard which is proposed by the mass media as these channels often provide the people with much information about the risk situations. Besides the fact that the mass media function as fast diffusers of information in the new and rapidly evolving western information society, they also function as agenda-setters as a large part of the public debate is determined by the subjects and risks that are made available through these media. So in a way, people may even learn from these sources and acquire information about a symbolic reality (Wiegman & Gutteling, 1995), which can form a basis for their personally constructed risk realities. Wiegman and Gutteling state that the more people are confronted with risk information through the media, the more they will learn from it and the less information will be acquired through interpersonal sources. It functions as a kind of observational learning that can dominate the learning process through interpersonal exchange of experiences or personal experiences. Bandura noted that the mass media also induce feelings of fear that are created on longer terms because of the rise of distortions in the media coverage of certain risk situations. The media tend to focus on the sensational, exceptional and dramatic aspects. On the one hand, we have to agree with the viewpoint that has just been described. Especially in the context of risk and threats,

people often did not experience the threat personally so they have to base themselves on the information that has been diffused by the media (Drottz-Sjöberg, 2000; Wiegman & Gutteling, 1995), and that has often been considered as the standard of verity. Wiegman and Gutteling have mentioned that direct behavioural experiences with risk situations can hinder the transfer of information, a principle that is assumed to be also applicable to the information that comes from mass media. So direct experiences may attenuate and even negate information (also from mass media) that is incompatible with these personal experiences (Wiegman & Gutteling, 1995).
The next section will take a closer look at the specific relationship between risk perception and behaviour. The concept 'behaviour' is very broad. We include both preventive behaviour as a means to prepare or protect oneself against a possible threat or risk context as specific risk information behaviour. As we already mentioned previously, risk information seeking can lead to satisfactory levels of confidence and information sufficiency and we will also mention the role information seeking plays in the context of self-efficacy.

2.6. Perception and behaviour

2.6.1. Psychological defences against threat

Let us first take a closer look at some cognitive defensive mechanisms that human beings are subjected to when being confronted with a risk situation. These cognitive mechanisms will play a major role in the formation of attitudes and beliefs and will eventually lead to a specific behavioural intention. There are certain psychological defense mechanisms defined that allow human beings not to be preoccupied with the evaluation of personal risk, which would only induce increased levels of chronic anxiety and stress (Handmer & Penning-Rowsell, 1990). These mechanisms have an important deal of survival value on both a physical as psychological level. Handmer et al. discuss four mechanisms that should be taken into consideration when designing risk communication strategies, as they are related to the core psychological processes when people are confronted with risks or threats. The personal invulnerability bias was defined by Thompson. It is a personal conviction that one will survive in any risk context, transcending all types of hazards and difficulties (Thompson, 1985). This psychological mechanism is especially indispensable when people are not preoccupied with the evaluation of risk, considering probabilities and potential outrage. We could state that although people that are confronted with direct and near risks may have high risk perception levels and low mental distances towards the risk, still a great portion of people will unconsciously use the personal invulnerability bias and will think that they will survive the threat, notwithstanding the severity of the threat.
The second mechanism is the defense mechanism of denial. It is different from the personal invulnerability bias in the sense that people will just deny the fact that they can personally be affected by the risk. In contrast with the Bayes' theorem, which states that *"posterior odds equal the prior odds multiplied by the likelihood ratio of the data"* (Marks, 1990 p.21),

humans are very poor intuitive statisticians and their subjectively perceived probability levels are mostly very low. The results in our empirical body will also confirm that a certain portion of the population totally ignores the risk and is convinced that the threat will not affect them. A third mechanism that can reach very simple to very complex levels is the mechanism of rationalization. The psychological process can act as a kind of cognitive dissonance reduction. As Marks states: *"Rationalizations of various ad hoc kinds invariably come to the rescue, and scientists are no exceptions"* (Marks, 1990 p.21). Our empirical data will also provide evidence for the fact that experts are perceived as the most credible sources for certain risk information. The last mechanisms that will be discussed is the one of dissociation (Hilgard, 1986). It states that the processing of risk and relevant risk information will have varying and even unpredictable impacts on the individual's beliefs. The individual's information processing will depend on the cognitive sub-system that is addressed when exposed to certain risk information. As mentioned by Handmer et al., in order to overcome these psychological barriers that can undermine the effectiveness of the risk communication programs, it is crucial to take into consideration these psychological defense mechanisms as they are inherent to the human nature (Handmer & Penning-Rowsell, 1990). It would be ignorant to live up to the conviction that human rationality is the norm and irrationality is only the exception. Let us now take a closer look at some theories and studies that scrutinize the specific relationship between risk perception and behaviour.

2.6.2. Experience and learning from others as predictors of behaviour

Saarinen has stated that there is very little empirical support for a direct relationship between awareness, risk perception and behaviour. He says that this is mostly because of the methodological biases: attitude and behaviour are concepts that are very hard to measure (Saarinen, 1990). However, he states that experience, as a form of knowledge, was assumed and proven to be a better predictor of behaviour. The association between self-protective behaviour and personal experience covers a wide range of risks. However, he poses the following key question, as not all people can have experience in all risk contexts:

"Are humans capable of learning from the experience of others, and if so, under what circumstances?" (Saarinen, 1990 p.281)

Assuming that the relationship between perception and behaviour is not direct or linear and taking into account that people could rely on the experience and knowledge of others (both experts as people in their personal environments with knowledge), we assume that the role of these 'mediators' should not be underestimated. Moreover, they can even play a crucial role in the diffusion of risk information and influencing attitudes or even behaviours. As Tim O'Riordan states:
"(…) communities and 'experts' need to establish cultural risk translators or mediators to provide an intelligible bridge between the different parties" (O'Riordan, 1990 p.296).

One of the final objectives of the empirical component of this PhD is the development of a tool that can identify and profile these mediators. We will refer to them as 'opinion leaders', which is actually a concept that has been developed long time ago in the context of political communication. We will discuss the concept of opinion leadership in section 4.
So opinion leaders can serve as mediators, but of course we also have to recognize the importance of experts and the media as risk information diffusers. Besides experience, there is also an important relationship between the concept of self-efficacy and behaviour in the context of risk.

2.6.3. Relationship between self-efficacy and behaviour

The construct of perceived self-efficacy was introduced by Bandura in 1977 as part of the social cognitive theory. It has especially been used in the field of health psychology to enhance preventive behaviour. The concept has frequently been integrated as a component in theoretical models of health behaviour (Leganger, Kraft, & Roysamb, 2000; Á. Pálsdóttir, 2008; Rimal, 2001; Schwarzer & Fuchs, 1996). Some examples of the models that the concept has been used in are: the Theory of Planned Behaviour (I. Ajzen, 1985, 2002; Armitage & Conner, 2009; Norman & Hoyle, 2004; Tolma, Reininger, Evans, & Ureda, 2006), in which self-efficacy is also strongly identified with self-control (Konttinen, Haukkala, Sarlio-Lahteenkorva, & Silventoinen, 2008; Schifter & Ajzen, 1985), the Protection Motivation theory (Floyd, Prentice-Dunn, & Rogers, 2000), the Modified Social Learning Theory (Wallston, 1992) and the Health Action Process Approach (Schwarzer & Fuchs, 1996). The influential role of the attitudes and belief of people in their personal efficacy is shown in their response to health communications aimed at altering health - impairing habits (Bandura, 2001 p.288). Meyerowitz and Chaiken examined four alternative mechanisms through which health communications could alter health habits: the transmission of factual information, fear arousal, change in risk perception and enhancement of perceived self-efficacy (Meyerowitz & Chaiken, 1987). Their final conclusion was that communicating about health fostered the adoption of preventive health behaviour primarily because of their effects on self-efficacy. Also Beck and Lund have proved that preventive health practices are stimulated better by a heightened self-efficacy than by elevating fear (Bandura, 2001).
Gordon defined self-efficacy as *"the conviction that one can successfully execute the behaviour required to produce outcomes"* (Gordon, 2003 p.1287).
Weigman and Gutteling also described the role of self-efficacy in the context of risk perception and behaviour. They state that "*the self-efficacy expectation concerns the cognitive subjective judgments of the person's own possibilities of carrying out certain behaviours, given adequate skills and sufficient motivation"* (Wiegman & Gutteling, 1995 p.234-235).
Especially within the context of risk reduction we can apply the concept. People who have a strong sense of risk in a certain risk context, are more likely to respond to messages they believe provide a functional strategy for reducing their own perceived level of risk (Sellnow

et al., 2009). Wiegman and Gutteling made the distinction between controllable and uncontrollable risks, relating them to man-made risks (controllable) and primarily natural disasters (uncontrollable). They mention that self-efficacy will be rather low with the uncontrollable risks because it is very difficult to cope with this type of risks. For the controllable risks, self-efficacy levels will be higher as the reactions or the behaviour of the individuals and even (part of) the community will try to control and influence the risk situation (Wiegman & Gutteling, 1995). Heath et al. also referred to the controllability of risks and the relationship with self-efficacy, but they relate controllability to a more indirect process of controllability of risk information (R. L. Heath, Bradshaw, & Lee, 2002a).

Heath et al. state that the ability to make informed decisions regarding self-efficacy is *"substantially increased when resources are made available and under their control"* but on the other hand *"access to information without an enhanced capacity for action will only frustrate individuals seeking to acquire more information"* (R. L. Heath et al., 2002a p.323). So in the optimal situation, risk messages can provide some level of self-efficacy.

It would be good to adopt these findings within the context of preventive risk behaviour. The stronger the preexisting perceived self-efficacy and the more responsible institutes promote and diffuse the idea that people can enhance their control over the risks that surround them, the more people will be convinced of their self-regulative efficacy. This will lead to better adoption of the recommended practices and the general preparedness of the public. So instead of scaring a certain portion of the population and inducing a culture of fear within certain communities or certain groups of people, we should empower them with the tools and self-beliefs for exercising personal control over their behaviour. Of course, people will never be able to control the risks themselves, nor the probabilities and even in a very limited degree they will be able to decide their exposure to risks because of the untransparency and the omnipresence of these 'new' risks. That is why an alternative approach of control should be offered. The risk information control could substitute the perceived control over the risk as such.

The next sections will discuss more thoroughly the specific processing of risk information behaviour as this type of behaviour is a vital element in the construction of risk perceptions. Risk information seeking will also play a major role in our empirical studies and will form a fundamental component for our classification of risk information seekers and the identification of opinion leaders.

2.6.4. A nested model of information behaviour

Information handling includes the seeking, processing, using and transferring of information (T.D. Wilson, 1999). That is why we will first decompose the concept of information behaviour in its three subfields: information behaviour, information seeking behaviour and information search behaviour. The three subfields can be considered as three levels of analysis, hierarchically ordered. The subjoined figure illustrates the hierarchical relationships between the three levels.

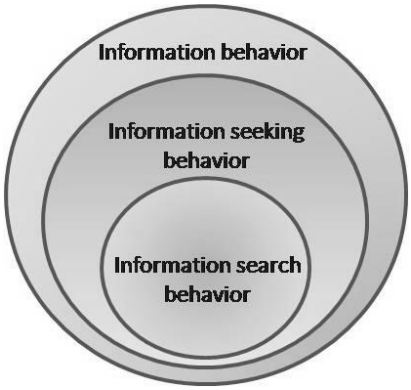


Figure 23: Nested model of information behaviour (T.D. Wilson, 1999)

Information behaviour embodies the general field of research, including the exploration of general responses on information.
Information seeking behaviour goes more into depth and incorporates the processes and methods that drive the motivations for information search. Information search behaviour will tackle the interaction between the media (various sources) and their users.

2.6.4.1. Information behaviour

A great deal of studies about information behaviour can be located in the setting of health risk factors (Baker, 1996; Baker & Pettigrew, 1999; J. David Johnson, Andrews, & Allard, 2001; Rimal, 2001; Rimal & Real, 2003). Pettigrew et al. define information behaviour as *"how people need, seek, give and use information in different contexts, including the workplace and everyday living."* (Pettigrew, Fidel, & Bruce, 2001 p.44). Also Wilson gave a clear definition of information behaviour: *"By information behaviour is meant those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way and using or transferring that information."* (T.D. Wilson, 1999). Based on this definition, we can say that there is a psychological (identification information needs and information seeking behaviour) and a socio-psychological (transferring the information) component.
Wilson provides us with a general interdisciplinary model that describes human information behaviour (T. D. Wilson, 1997).

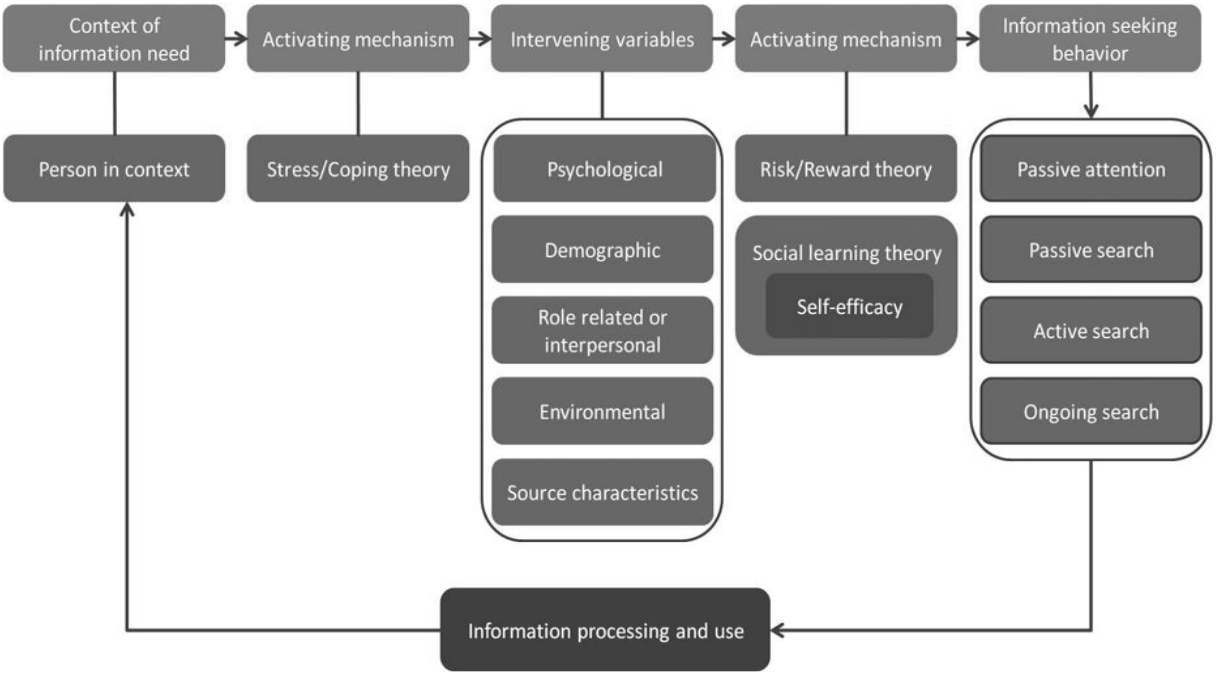


Figure 24: Interdisciplinary information behaviour model (T. D. Wilson, 1997 p.569)

The model integrates both social and cognitive mechanisms as influential concepts on information behaviour. The first stage in the model refers to the context of the information need (person in context), continuing with the activating mechanisms that should link the information need with the information seeking decision. Wilson suggests several activating mechanisms, such as the stress and coping theory but also the risk-reward and social learning theory. He also includes several intervening variables that may act between the various stages of the model. These intervening variables can be located on a personal level (personal characteristics such as cognitive dissonance, selective exposure, physiological, cognitive and emotional characteristics and knowledge, socio-demographical characteristic etc.), a social or interpersonal level and an environmental or situational level. Also the accessibility and credibility of the source can play a crucial role in the entire process.
Information seeking eventually leads to information processing and use of information and links back to the primary situation or context of the information need.
The three activating mechanisms for information seeking behaviour are of vital importance to our work as they are closely related to the risk perception context. It is relevant to relate the stress and coping theory to information seeking behaviour, as Miller and Mangan state:

"...one key situational property that has consistently been found to affect stress is whether the individual has maximal information (predictability) or minimum information (unpredictability) about the event and its effects" (Miller & Mangan, 1983 p.223).

2.6.4.2. Information seeking behaviour

Sonnenwald defines information seeking as a process that involves both individual and cognitive traits of a person as the social context.

"Information seeking (IS) is viewed as a dynamic process of a user making sense that involves cognitive behaviour at the level of individual perception and an associated communicative behaviour at the level of the social context when insight is sought via linguistic means from other sources." (Sonnenwald, 1999 p.1)

Ter Huurne summarizes that *"information-seeking behaviour can be viewed as the totality of behaviours or actions motivated by the recognition of missing knowledge"* (E. F. J. Ter Huurne, 2008 p.15). Ter Huurne also mentioned that information seeking behaviour can be classified in different ways. Information retrieval studies integrate two approaches of information seeking: the system-centred approach and the person-centred approach (Ellis et al., 2002; Ford, 2004). The relationship between information seeking and information channels and sources is the key research item in the system-centred approach. Wilson has announced the shift towards a more person-centred approach, that arose in the 1980s (T.D. Wilson, 2000). The person-centred approach is actually more inspired by social sciences as it takes into consideration influential factors of various levels in the information seeking process. Both individual factors as attitudes, beliefs, emotions and self-efficacy as the contextual factors that the individual is subjected to should be taken into account when scrutinizing the information seeking behaviour of people (E. F. J. Ter Huurne, 2008).

Other classifications in risk information seeking literature refer to the intensity of information seeking (L. A. Kahlor, 2007). The intensity can vary from very little or even more unconscious scanning behaviour (passive information seeking) to intense, active information seeking (L. Kahlor, Dunwoody, Griffin, & Neuwirth, 2006).

McKenzie developed a two-dimensional model to describe information practices (McKenzie, 2003), also including concepts of active information seeking and scanning.

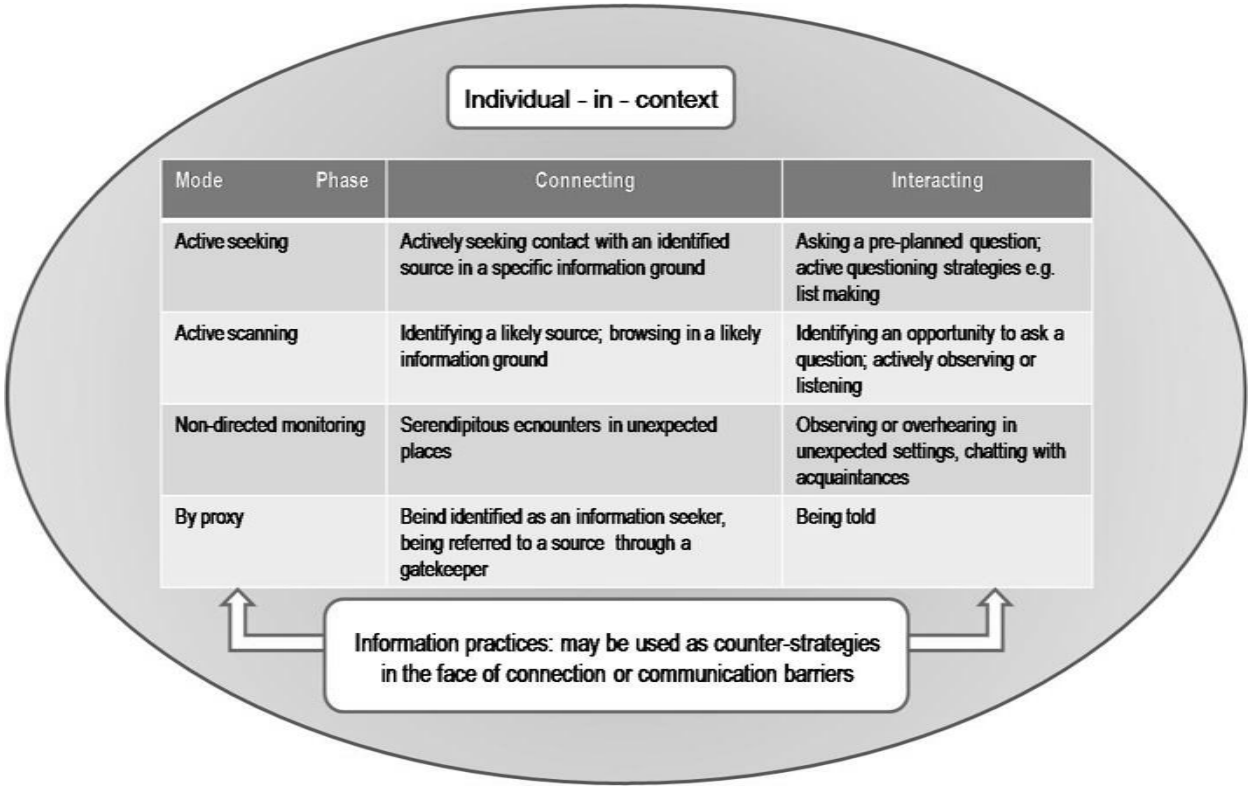


Figure 25: Two dimensional model of information practices (McKenzie, 2003 p.26)

The four modes of information seeking are the result of two stages of the information seeking process: **connecting** (identifying and connecting directly or indirectly with sources or potential sources) and **interacting** with sources. According to McKenzie, a person's information practice can move iteratively from one mode to another. With this model McKenzie reconciles both the system-centred (source oriented) as the person-centred approach, but the main focus still lies with the individual as primary actor in the process.

2.6.4.3. Active and passive information seeking

Wilson also stated that information behaviour is *"the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use"* (T.D. Wilson, 2000 p.49). Wilson also recognized the dual structure of information seeking behaviour: the difference between actively seeking information and passively retrieving information is important to acknowledge and to incorporate in our studies. These two modes of information seeking were not sufficient in our point of view, because we thought that people will also be triggered to seek information under certain conditions: e.g. when there is an emergent threat (terrorist attack, …), people will shift from passive information gathering to active information seeking because of their actual and insistent need for accurate information when they feel the need for information control. So according to Wilson, active information seeking is *"the purposive seeking for information as a consequence of a need to satisfy some goal"* (T.D. Wilson, 2000 p.49). A

similar definition has been given by Johnson and Meischke, who describe information seeking as *"the purposive acquisition of information from selected information carriers (…)"* (J. D. Johnson & Meischke, 1993 p.343).
Wilson has elaborated on the definition of 'active information search' by categorizing this behaviour into two types (T. D. Wilson, 1997):

- active search includes the gathering of information and development of knowledge through the active and constant process of seeking information
- ongoing search which happens only occasionally with the purpose of updating or renewing/adding information and knowledge

Huber also bases himself on the active information searching paradigm (Huber, Wider, & Huber, 1997). His research confirms the fact that people prefer the reinterpretation of uncertainty information to establish an elimination of the uncertainty so that in the end probabilities are either so small that the risk becomes negligible or that so large that the threshold for further action is passed. Building on this reasoning, we can add the hypothesis that people use the information about how and when they could be exposed to the risk and information about the controllability of the risk to create a personal probability estimate. Sjöberg found out that people will rather use information about the severity of the consequences of the risk when they wish to mitigate a risk (Lennart Sjoberg, 1999).
Besides active information seeking, there have been defined several other styles of information seeking. Wilson and Walsh also defined passive attention, which refers to the passive and unintended gathering and acquisition of information e.g. when people come across information in the media. This passive attention mode could be compared to the non-directed monitoring in the two - dimensional model of McKenzie (cfr. supra). Sanda Erdelez uses similar concepts, which she labeled as 'information encountering', 'accidental discovery of information' (ADI) and 'incidental information acquisition' (Erdelez, 1999 p.25). She integrates accidental, unintentional and unexpected nature of the information encountering. Besides the information encountering, she also scrutinized the information sharing behaviour of people in this context. She found out that information was mostly encountered in a mixture of information environments and through various channels, but the sharing of information was primarily done through personal contacts (face to face or via e-mails) (Erdelez & Rioux, 2000). If we refer to McKenzie's model, this concept can be linked to the 'by proxy' information seeking mode, where people find information through an intermediary. Other authors added the concept of serendipity: the 'fortuitous' retrieval or encounter of useful information (Foster & Ford, 2003; Toms, 2000). Foster and Ford mentioned that serendipity is unpredictable and is not something that can be controlled, but they do emphasize the importance of the 'prepared mind' (Foster & Ford, 2003 p.336) and indicate that certain attitudes such as *"(…) consciously to be open and receptive to chance information encounters" (Foster & Ford, 2003 p.335)* may stimulate people to make the best out of serendipity.

Solomon described in his studies the patterns of information behaviour as dynamic and nonlinear. According to him, people do not think of information and perform certain information behaviours in isolation from what they are coping with at a given time in a certain personal 'information environment' (P. Solomon, 1997a, 1997b). We agree with the dynamic and nonlinear character of information seeking as the mode of information seeking may vary depending on the topic, the involvement of the individual at the time and the personal 'information environment', as mentioned by Solomon. When the media coverage of a certain risk, e.g. terrorism or the H1N1 virus threat, is high, the risk will be put on the public agenda and a larger portion of the population will shift from non seeking to passive information gathering and even active information seeking. Within this context, we integrate the concept of event triggered information seeking: the information seeking behaviour that is performed when an important issue in the specific context of the risk has occurred, e.g. a new terrorist attack in Europe will induce increased levels of event triggered information search or when another person has deceased after being infected with the H1N1 virus, some people will look for more information about the virus and how they can protect themselves because of this fact.

This PhD mainly focuses on person-centered information seeking behaviour and incorporates both passive information scanning, event triggered information seeking (active seeking triggered by an important event that increases involvement) and active information seeking. These three types of information seeking will be the main components for the classification of risk information seekers, besides social behaviour and the concept of opinion leadership, which will be discussed in 3.7.

2.6.4.4. The Framework of Risk Information Seeking

The Framework of Risk Information Seeking (FRIS) is a model that identifies factors (antecedents, direct and indirect determinants) of risk related information behaviour. It discusses how people seek (or alternatively avoid) relevant information, using various information sources through information channels in the context of external safety issues (E. F. J. Ter Huurne, 2008). The model takes into account various socio psychological risk-related factors that drive information seeking behaviour. It incorporates the audience or receiver-based perspective of risk communication and as the author mentions herself: it incorporates guidelines for connecting the underlying processes of responses to risk-related information.

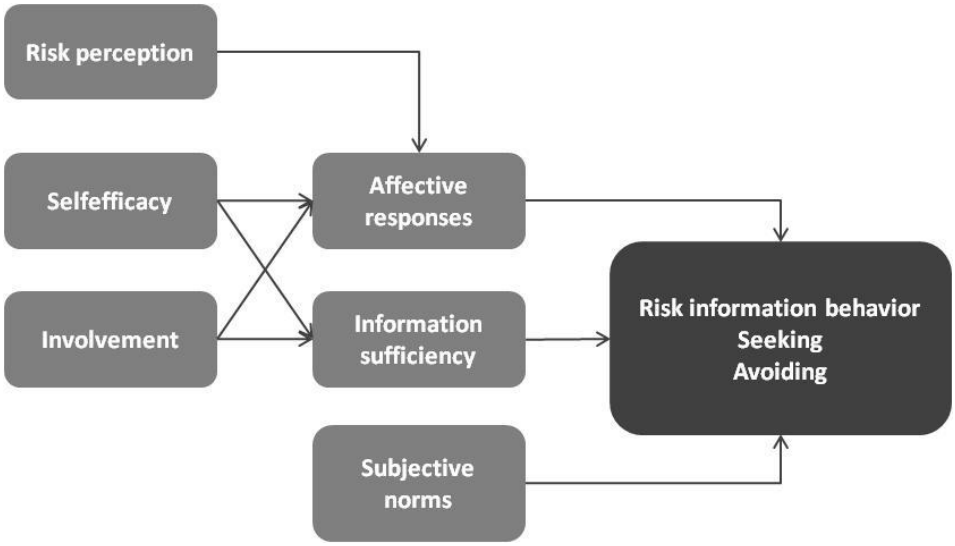


Figure 26: The Framework of Risk Information Seeking, FRIS (Ter Huurne 2008 p.136)

The FRIS model integrates three basic factors that contribute to the awareness of the risk context. It involves the particular perception of the risk, the perceived personal control and the involvement of the individual with the risk context.

Risk perception

As mentioned before, risk perception is one of the key drivers for concrete behaviour (responses). Risk perception is often based on availability heuristics. From a cognitive psychological point of view we could say that, based on cognitive heuristics, people reduce the complexity of problems. Especially the availability heuristic plays an important role in this reduction process. The availability heuristic states that the easier we can acquire a large quantity of information about a certain risk, or the more examples we have embedded in our minds concerning a certain threat, the bigger the estimated, perceived risk will be. So people tend to have the cognitive processing reaction that the more easy something comes to one's mind, the higher their risk perception about the risk in their direct environment will be (Shrum & Oguinn, 1993; Slovic et al., 1981). The heuristics can explain a great deal in the variance of risk perceptions in similar risk contexts. Various scholars have found strong associations between risk perception and affective responses (Finucane, Alhakami, Slovic, & Johnson, 2000; Kuttschreuter, 2006; Loewenstein et al., 2001). The correlations were consistently positive. Also Ter Huurne found a strong positive relationship between risk perception and affective responses.

Perceived personal control

Ter Huurne integrated perceived personal control or self-efficacy in the FRIS framework because it was a concept that had been absent in frameworks about risk information seeking (Afifi & Weiner, 2006). According to her empirical results, a perceived lack of self-efficacy evokes affective responses and decreases senses of information sufficiency (E. F. J. Ter

Huurne, 2008). As the authors states, the sense to be able to control the risk (hazard and outcomes) plays a vital role in the risk response and the information behaviour decisions. The Risk Perception Attitude Framework claims that the effects of risk perceptions have to be linked to efficacy beliefs (Rimal & Real, 2003).

Involvement

Personal importance or involvement are also valuable contributors to understand the process of risk information search. When people are faced with uncertainty or risky situations, problem recognition could rise when they perceive their self- or altruistic interests are affected (E. F. J. Ter Huurne, 2008). The individual's awareness of this problem will induce and stimulate the involvement or motivation to seek information about the specific risk. This has been formulated by Petty and Cacioppo, the founders of one of the most important models that incorporates involvement in an information processing model (Petty & Cacioppo, 1986) but also by Heath et al. in the specific context of risk communication (R. L. Heath, Liao, & Douglas, 1995b). Involvement or motivation could increase when risks becomes personally relevant to an individual. A certain level of involvement could stimulate this individual to actively seek information about the risk and reduce the possible feelings of uncertainty, anxiety or worry (Nathan, Heath, & Douglas, 1992). Ter Huurne also empirically confirmed that higher levels of involvement increase the need for additional information to counter the feelings of information insufficiency as well as affective responses such as feelings of worry and anxiety. In this way people are indirectly motivated to seek or avoid additional information about the specific risk. Ter Huurne adds the affect concept to the basic premise that involvement is positively associated with individuals' willingness to seek information (B.B. Johnson, 2005; LeeAnn Kahlor et al., 2003; Nathan et al., 1992; E. F. J. Ter Huurne, 2008).
The FRIS model, as Ter Huurne states herself *"is unique in recognizing the multidimensional nature of risk-related information behaviour from a social-psychological perspective"* (E. F. J. Ter Huurne, 2008 p.137). It recognizes that, besides a lack of knowledge, affect (emotions) and social contexts can also be very significant triggers for information search. The framework is very much public-oriented in the sense that it scrutinizes how people react to risk communication efforts and what individual and contextual factors may play a role in the information seeking and processing processes.

2.6.5. Information needs

Dervin's Sense Making Theory describes information needs as 'cognitive gaps' as in some situations, a person's (perceived) knowledge is insufficient to deal with the problems that have risen. In order to make sense of their experiences, these persons will need and use information (Dervin, 1999).

Some authors have labeled uncertainty as a driver for information needs and information search (Krikelas, 1983; C.C. Kuhlthau, 2004; Sonnenwald, 1999; Yoon & Nilan, 1999). Some important theories that include this premise are the information seeking theory or IST (Atkin, 1972, 1973), the anomalous state of knowledge theory or ASK (Belkin, 1980), the model of the information search process or ISP (C. C. Kuhlthau, 1991), the uncertainty reduction theory or URT (Berger, 1986) and the heuristic-systematic model or HSM that we already discussed in 2.3 (Eagly & Chaiken, 1993; Griffin et al., 1999).

Uncertainty could be seen as a knowledge gap, but with extra emphasis on the awareness of the lack of knowledge. Kuhlthau states that uncertainty due to a lack of understanding, a gap in meaning, a limited construct initiates the process of information seeking (C.C. Kuhlthau, 2004). Also Driskill and Goldstein defined uncertainty as *"the perceived lack of information, knowledge, beliefs and feelings (…)"* (Driskill & Goldstein, 1986 p.41). Albrecht states that uncertainty motivates information seeking because it is uncomfortable, it is the lack of attribution confidence about cause-effect patterns (Albrecht, 1988). Palenchar and Heath take this into consideration to state that people's information needs are functional to reduce uncertainties about the subjects under consideration and those who are creating these uncertainties (M. J. Palenchar & Heath, 2007). Information needs have been characterized as entirely subjective (Rosengren, 1974), arising from two mismatching self-perceptions: the desired knowledge about an issue and the assessed knowledge. This mismatch results in an 'anomalous state of knowledge' (Belkin, 1980). Belkin describes the anomalous state of knowledge as the recognition of an anomaly by the recipient in his/her state of knowledge. This anomalous state of knowledge triggers an iterative process of refinement. Besides the personal drivers as triggers for information needs, there is also a social dimension to take into consideration. Wilson added a social dimension to information needs: he pones that a person's information need is formed by a person's social roles and his social environment (T. D. Wilson, 1997). To combine the previous perspectives, we think that information needs are to be situated in relationship with an individual's cognitive and affective structures combined with the situational factors that interrelate. Several authors share the same opinion (Allen, 1996; T. D. Wilson, 1997). People are at the same time individuals and group members, so their information need is the result of the processes that integrate both individual needs as social and group needs. These interrelationships between the individual and his social context lead to two types of information need: on the one hand a need that takes place at an individual level and at the other hand the need that takes place within the group he makes part of.

The concept of 'Information needs' has to be refined as there is a difference between a lack of knowledge and a need for information. People whom lack knowledge, and are aware of it, will not necessarily feel the need for information. So a lack of knowledge is not always to be followed by information behaviour (Sonnenwald, 1999).

Taylor has described four levels in the cognitive development of information needs (A. Pálsdóttir, 2005; R. S. Taylor, 1968): the visceral, conscious, formalized and compromised need.

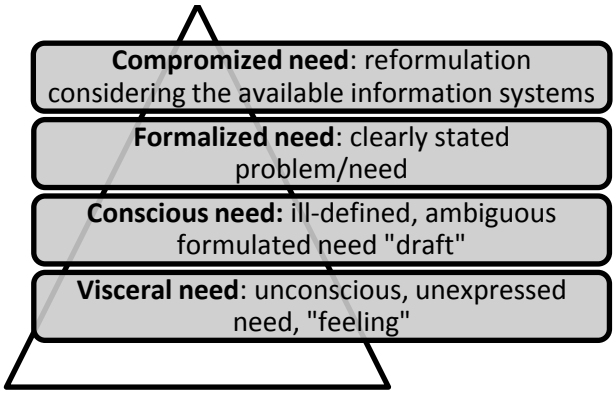


Figure 27: Four levels in the cognitive development of information needs (R. S. Taylor, 1968)

At the lowest, 'visceral need' level, the information need only exists unconsciously and is inexpressible. This need can develop to a conscious need, which is a mental picture of what is needed but it is still very ill-defined. The third level is the formalized level. People reach this level when a clear and formal expression of the problem and information need can be made. The highest level is the compromised need and is reached when people have redeveloped their statement of the information need, bearing in mind the specificities of the available information systems.

2.6.6. Specific information needs in the context of unknown risks

Lion, Meertens and Bot scrutinized the information seeking process, more specific they wanted to find out what kind of information people are looking for when they are confronted with unknown risks (Lion et al., 2002). They also presented the relationship of necessity of information with the key dimensions of the risk perception concept. In general, confrontation with unknown risks induces active information seeking behaviour.

These authors also discuss the relativity of the dispersion of probability information. As we have already mentioned multiple times, some people have difficulties with using this kind of information, even when they have to take risky decisions. The central research question was to find out the desire for information about unknown risks. In a first phase, nine focus-groups were conducted. Several categories of risk information were created: by means of the results of the focus-groups: knowledge information (what is the risk?), information about the risk consequences, controllability information (what can be done about the risk?), information about the exposure (location, level of exposure), responsibility information (blame?), social coping information (how do others deal with the risk?).

The results of the focus-groups were supported by a questionnaire that was distributed among 500 households in the Netherlands. 124 questionnaires were used to perform the data analysis. The results delivered the following sequence of importance of the information categories: 38,3% of the sample rated knowledge about the risk as the most important question, followed by information about the exposure (22,3%), consequences (17,2%),

controllability information (10%), probability of the consequences (5,8%), others' experiences with the risk (2,9%) and responsibility of the negative consequences (1,2%). Remarkable was the significant negative correlation ($r=-0,32$, $p<0,01$) between the familiarity with the risk and the degree in which people want to know what the risk consists of (knowledge component). There was also a significant negative correlation (-0,26, $p<0,01$) between the familiarity and the desire to know to what degree the risk is similar to a more familiar risk. These results support the hypothesis that the less familiar people are with a certain risk, the more they want to find out about it and create a clear definition and the more they will compare the risk to a more familiar one. We could define this process as the desire for control. People will induce this feeling of information control by seeking information. This may happen unconsciously (passive risk information scanning) or consciously (active information seeking). This active information search is then a means to satisfy the need for knowledge and achieve a cognitive equilibrium. We must make sure that we make the difference between the desire for risk information control or the desire for control of the risk and its consequences. Another remarkable result from this study shows that some people would rather receive a limited amount of unequivocal information while other people want as much information as possible. One of the final conclusions was that, even when people are not directly confronted with a risk, risk communication can be very difficult since some people are not and will never be susceptible to information about the risk. Especially people that are not actively searching for risk information nor passively receiving information will make belong to this group.

This is one of the key arguments in favour of further research regarding risk information needs and the necessity of a customized proliferation of certain types of information to special target groups. The identification of these key target groups in the process of customized communication efforts can be established by means of a psychometric measurement model that includes some key identification concepts. The research of Lion, Meertens and Bot has delivered a considerable contribution to the operationaliaation process of our key items regarding specific information needs in the risk contexts of our quantitative empirical studies.

Now that we have discussed the concrete information seeking processes and how information needs are developed, we will glance at the information sources that one the one hand may be addressed to retrieve risk information or on the other hand will diffuse risk information actively into the community.

2.7. Information sources

The spectrum of information sources has increasingly risen with the diffusion of new information and communication technologies. Besides the flood of information, people are also confronted with the various sources. Sonnenwald used the term 'information horizon' to define the range of information sources that people use to seek information (Sonnenwald, 1999). He also stressed that a person's information horizon can be socially shaped. So the choice of information sources can be influenced by ones social environment, especially when it comes to issues such as source reliability and credibility. Savolainen and Kari used the concept of information horizons in their conceptual framework. They state that it is in a person's perceived information environment that the information source horizon is constructed (Savolainen & Kari, 2004). This personally en socially constructed information environment is a rather general and stable mental 'map' of information channels and sources. However, information sources are generally stable for everyday information seeking, but there are also more dynamic information horizons. Horizons that are constructed for specific problems or in certain situations are more dynamic and variable. What sources people will use may depend on ones social cognitive factors (P. Solomon, 1997b), by the phase in which a person is positioned in the process of seeking meaning, by the nature of the information need or the characteristics of the information problem that has to be solved (Á. Pálsdóttir, 2008). Littlefield et al. use the term 'meaningful access' to refer to opportunities for interaction with experts and key persons in the decision making process and opportunities for acquiring the information that they need to make well-informed decisions in their risk contexts (Sellnow et al., 2009).
Besides the role of the mass media as dominant information diffusers (as discussed earlier), we should not underestimate the role of interpersonal sources. With this paragraph we trespass the border from the individual to the social level of analysis in this chapter.

2.8. Interpersonal sources

Several studies have proved that people often prefer interpersonal sources (Krikelas, 1983), especially when they are looking for practical information or when they are in a personal situation (Julien & Michels, 2000). Even though the most common mode of delivery for 'official' risk communication is the mass media, some authors suggest that personal contact is a more effective approach (Handmer & Penning-Rowsell, 1990 p.72) and some even dare to pone that there is little evidence that the mass media are effective persuaders (W. J. McGuire, 1986).
Pálsdóttir combined various findings of scholars to explain why people seem to favour interpersonal sources in the context of everyday life problems:

- The ability of the information seeker to interpret the information that is offered is different with formal sources than with interpersonal sources.

- The interactive nature of interpersonal communication (S. E. Taylor, 1991) allows people to ask for additional explanations.
- Some state that interpersonal information seeking is the continuation in the process after having consulted other information sources (mass media etc.) In this way, people are able to ask for additional information to relatives or friends so that the information will make sense in their own, personal environments (Agada, 1999).

So we may carefully conclude that interpersonal information sources are very valuable sources for people to amplify their information processing. Individuals as sources can be used to retrieve new information, to gain more comprehensible explanations in difficult matters, to confirm one's thoughts and cross-check information, or to come to mutually constructed perceptions based on the shared information exchanges.
The preference of interpersonal sources also has to do with their higher perceived reliability (A. Pálsdóttir, 2005). The reason for this may be twofold. It refers to the perceived reliability and trustworthiness of the persons involved. The personal sources are perceived to be knowledgeable and have a certain expertise in the domain that the information seeker is looking for information. The communication style is likely to be similar for sender and receiver, which is not always the case with formal sources (spokespeople authorities, mass media etc.) so we may state that people will perceive interpersonal sources as more reliable because they 'speak the same language' and the information and message style is fitted to one's own style.
Also the ease of access plays an important role as interpersonal sources are more available and more accessible, both in physical as in mental terms. To conclude, interpersonal sources will generally be more useful than formal information sources because of the lower physical, cognitive and social barriers (A. Pálsdóttir, 2005; Spink & Cole, 2001). Some publications with recommendations even include the need to work with specific target group audiences, paying special attention to the potential personal interaction in public education programs (Filderman, 1990).

2.9. The role of experts in the risk communication strategy

Are they an ideal combination of an interpersonal source and an institutional information agent? We think the answer to this question is certainly affirmative. Experts that can communicate impartially, clearly and unambiguous are perfect intermediary information agents as their credibility as a source and the perceived reliability of the information they are disseminating will be higher than for spokesmen of governments or organizations.
Leiss (2004) is convinced that more resources should be spent on risk communication strategies in the risk management process and he puts special attention to the role of experts. The most important reason is that there is a fundamental and permanent difference between de way in which experts and policy makers diffuse information about the risks that surround us on the one hand and the public perception of risks on the other hand. Leiss

advocates a constructive dialogue between experts and the general public about the nature of real risks, their causes and about risk management strategies. He formulates the following tasks for experts: (1) interpreting and translating the results of scientific risk judgment research into a language that can be understood by the general public, (2) understanding and scrutinizing the public risk perceptions and (3) to involve all stakeholders into a process to understand all risk factors (Leiss, 2004)

Experts are the ideal opinion leaders. Of course, opinion leadership is a trait that is not only assigned to experts. Opinion leaders can also be found in smaller social networks. The interpersonal influence of opinion leaders is probably the most powerful in the risk communication process. That is why we will theoretically discuss the concept in the following section and try to empirically identify and profile this vital target group in the empirical body. Let us first discuss the concept of risk as a socially constructed concept.

3. Social Risk Perception

3.1. The social and medial construction of risks

In previous paragraphs we already stated that the "new" civilized risks are constructed through knowledge. Knowledge can be translated in different flows of information which, depending on the source and the receiver, result in an induction of socially and medially constructed risk perceptions. So the risks are constructed on the base of a causal interpretation. The ripple effects that are established through these control processes of various information agents (media, governments and scientists) can sometimes be mapped and controlled, but we can never be certain that we know all the effects and consequences that are induced by the ripple effects. So the amplification and attenuation processes are not completely controllable, like the risks that are the main players in these processes. Beck also states that we would no longer be able to estimate the new risks on the basis of our own knowledge, and that we are completely dependent on the induced social and medial definitions. Consequently, we become dependent on the norms, interests, and biases of those who possess and disperse the knowledge and define the risks. We could say that this theory reflects a lot of the conceptual ideas of the hypodermic needle theory (or magic bullet theory) of Katz and Lazersfeld (1955). However, we think that the selective perception theory is more appropriate when we take into consideration the new medial context that people live in. The context provides them with instant and rapid access to information sources. We must take into consideration that media and governments play important gatekeeping roles when it comes to information creation and dispersion, but the classical perspective of a one-way information injection into the society is not correct.

Berger and Luckmann have explained the theory of social construction of reality in their book 'The social construction of reality' (Luckmann & Berger, 1991). The perspective that information is not isomorphic and that meaning and realities are constructed by understanding, perceptions and social influences was already communicated by Parsons in

1951 (Parsons, 1951). However, some scholars claimed that there are still very important gaps in knowledge about how to communicate about complex issues and science when taking into consideration that meaning is constructed by the receiver and his larger community network (Fessendenraden, Fitchen, & Heath, 1987). There are actually two perspectives on the importance and function of social influences on the social construction of risk realities. On the one hand there are the psychologically inspired frameworks that recognize the social aspects and social linkages but merely considers them as sources of information and elements in the information transmission process. Direct communication between individuals and within groups will influence individuals but eventually the cognitions remain the central drive for the formation, maintenance and altering of attitudes and behaviours (Bovasso, 1996). On the other hand there are some frameworks that are more sociologically inspired. These theories consider the relational aspects of individuals, the resulting networks and the larger self-organizing systems as the 'social' units of analysis that function as attitude, knowledge or behavioural studies (Beer & Walton, 1990) and facilitate or constrain the information flow and influence the individuals in that network (Scherer & Cho, 2003). One theory that can be situated in this last category of frameworks is the contagion theory of risk perception that will be discussed in the next paragraph.

3.2. A social network contagion theory of risk perception

In the first part of this chapter we discussed the individual cognitive mechanisms in which individuals collect, process and form risk perceptions. However, we considered the individuals as atomized units rather than interacting elements of a social system. As Scherer and Cho stated, these individual or micro level theories do not help explain how risk perceptions may vary within one single community or between communities (Scherer & Cho, 2003 p. 261). This was their drive to construct the network theory of contagion. This framework, that is based on organizational and community social network studies suggests that the individual risk perceptions and eventually the communal risk perceptions are influenced by the relational characteristics of individuals and their participation in self-organizing systems. The social units, as they call the groups of like-minded individuals, behave as attitude, knowledge or behavioural studies. Cognitive analyses suggest that groups of individuals arrive at similar or differing and even opposing conclusions in certain risk contexts because they receive common or varying information through various information channels and from various sources. But this approach does not integrate any social or social-structural variables that may play part in these social risk constructions. The authors empirically confirmed the existence of risk perception networks: *"relational groupings of individuals who share, and perhaps create ,similar risk perceptions" (Scherer & Cho, 2003 p.261).*

As we will discuss further in this chapter, many studies have been performed that have examined the functioning of community networks from a diffusion of innovation perspective. One of the key scholars in this expertise is Rogers with his diffusion of

innovation studies (E. M. Rogers, 1995; Everett M. Rogers & Shoemaker, 1971; T.W. Valente, 1999). Similar studies were also conducted in other contexts such as the context of the adoption of new drugs by medicals (Coleman, Katz, & Menzel, 1957; T.W. Valente, 1999) or a political context (Berelson, Lazersfeld, & Mc Phee, 1954; Erik C. Nisbet, 2005). However, in the context of risk communication and the diffusion of risk information there have rarely been studies that scrutinize this theory even though better knowledge of these processes in risk contexts would have great value for the development of more effective risk communication strategies that involve complex risk information (Scherer & Cho, 2003).
The social network contagion theory bases itself on the assumption that individual risk perceptions and eventually the communal risk perceptions are influenced by the relational characteristics of individuals and their participation in self-organizing systems. Also the diffusion studies start from the idea that the difffusion of an innovation occurs through a five–step process. This process is similar to the process of decision-making. It occurs through a series of communication channels over a period of time among the members of a similar social system. Rogers (E. M. Rogers, 1983) categorizes the five stages (steps) as: awareness (knowledge), interest (persuasion), evaluation (decision), trial (implementation), and adoption (confirmation). Rogers relies on the ideas of Katz & Lazarsfeld and the two-step flow theory (as discussed in 4.3.1.) in developing his ideas on the influence of opinion leaders in the diffusion process (Katz & Lazersfeld, 1955). The diffusion model has been applied in various contexts, and can deliver a very significant contribution to the field of risk communication. Especially the concept of opinion leaders will play a crucial role in the following sections. We consider opinion leaders as the driving forces of the social diffusion of risk information. As we will discover in our empirical studies, the socio-demographical traits, media profiles and specific characteristics of opinion leaders can strongly vary depending on the risk contexts. It will be one of the key objectives of our quantitative research studies to develop a generic measurement tool to identify the opinion leaders in a specific risk context within a community. In the last sections of this chapter, we will put special emphasis on the theoretical background of the opinion leadership construct.

3.3. Opinion leaders and the media in the early age

Since the raise of mass communication studies, the following question has always risen and will always rise: what is more powerful, the mass media or interpersonal communication? Naturally, there will also be various, similar or very opposing answers to this question because the relationships between individuals, groups and the media are always changing due to the evolving characteristics of media. At the end of the early stage of opinion leadership studies, the two-step flow theory had gained approval in academic environments. It incorporated a new perspective on the mass communication process: the perspective that the flow of communication was less direct and immediate and powerful as had been previously assumed and proclaimed by several theoretical frameworks such as the ‘powerful media paradigm’, or the ‘magic bullet theory’ or ‘hypodermic needle theory’(rooted in

1930's). The vital role of personal communication was stressed by several authors, and more specifically, the function of opinion leaders within the process of two- and multi step communication flows was stressed and empirically confirmed. As these opinion leaders were of great importance because of their specific media behaviour but more important their personal influence on attitudes and behaviour of their peers, an intense and exuberant effort to investigate the nature of opinion leaders and their characteristics in terms of personality, media use and social behaviour was set off. This ushered in a new period of the "Golden age of opinion leaders". Let us first take a look at the three perspectives on mass media audiences and the role of opinion leaders in these perspectives.

3.3.1. Three perspectives on mass media audiences

DeFleur has described three different perspectives on how individual audience members react on and interact with the mass media and their messages (DeFleur, 1972). The three perspectives are not mutually exclusive; a cooperative interaction is more probable. Wood has summarized these three perspectives schematically (Wood, 1983 p.176-178).

3.3.1.1. Individual differences perspective

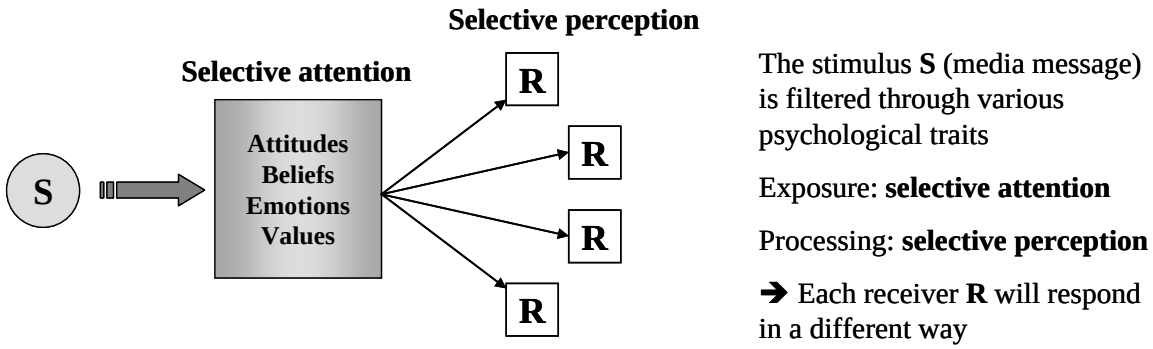


Figure 28: The individual differences perspective (Wood, 1983 p.176)

The individual differences perspective is a modification to the basic stimulus-response model of communication which states that a certain media message (stimulus) triggers an identical reception or behaviour (response) among all receivers of the message. The first model specifies that individuals will have differing responses because of selective attention and perception mechanisms. The second model incorporates the effect of social relationships and the potential of indirect effects on individuals.

3.3.1.2. Social relationship perspective

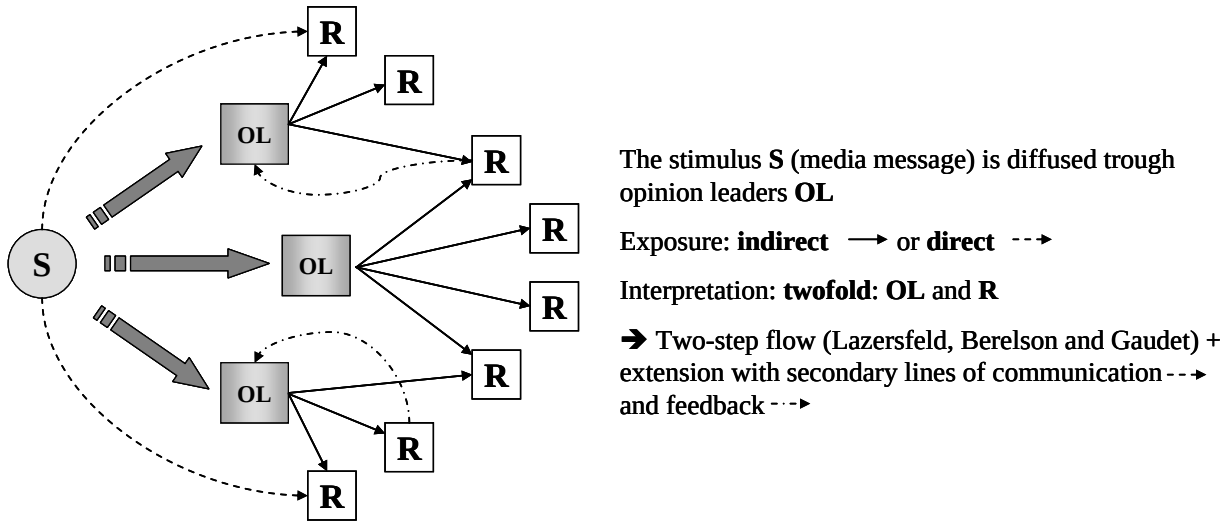


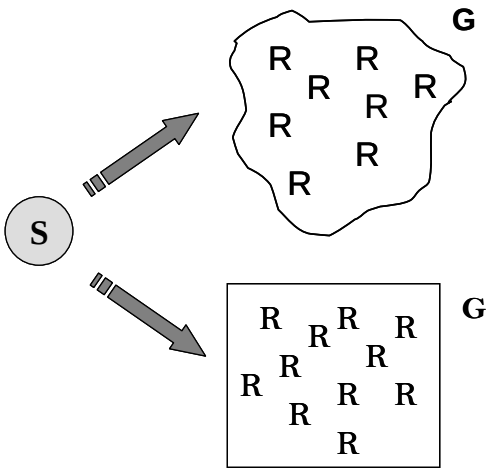
Figure 29: The social relationship perspective (Wood, 1983 p.177)

The social relationship perspective integrates the concept of opinion leaders as mediators of messages. Opinion leaders serve as informal information interpreters and personal information diffusers. The model is based on the study of Lazersfeld, Berelson and Gaudet, which we will discuss further in this chapter (Berelson, Lazersfeld, & Gaudet, 1950). They introduced two step flow of communication by integrating a non-direct pathway for messages to reach the audience. Besides indirect message transaction through mediators (opinion leaders), direct communication and feedback flows are possible. Earlier, we stated that opinion leaders can both be disseminators and recipients of information and influence. So actually, instead of the simple two-step process it is more accurate to depict the communication flow as a multi-step process (G. Weimann, 1982).

Even though this model is rather simplistic, it offers many possibilities for studies in mass communication. We missed the idea that people who shared similar personality or socio-demographical traits will react in similar ways to a certain stimulus, with in-group opinion leaders as potential mediators of information.

The next model will integrate this suggestion that groups of people with shared personality or socio demographical traits will respond to a certain message in the same way.

3.3.1.3. Social categories perspective



The stimulus **S** (media message) is received by groups **G** of receivers **R**

Exposure: direct, individual

Interpretation: similar interpretation by group members

➔ Individual audience members of one group are likely to respond in a similar way

Figure 30: The social categories perspective (Wood, 1983 p.178)

The third model assumes that there are certain social categories of people who will respond in a more or less similar way to a certain stimulus (message) because they share similar personality traits or socio-demographical characteristics. Contradictory to the first, individual differences model, which has a psychological nature, this last model is inspired by the sociological viewpoint that, in spite of the heterogeneity of the contemporary society, groups of people will differentiate from each other based on their shared characteristics, beliefs, behaviour etc.

3.3.1.4. Multi step social interaction perspective

Since the previous three models were not satisfactory as a theoretical fundament for our empirical study, we decided to integrate all modifications into one new model: the multi step social interaction perspective. The new model still involves opinion leaders as crucial elements in the diffusion of information, but also the idea that members of homogenously composed groups will react in similar ways. Every group of people (G or G) can have its own key opinion leader (or more). The information (S_1) can flow directly from the source to the receivers, through the opinion leader (OL G) who transmits the information directly to his group member or even through an opinion leader (OL g') who changes the information and sends a modified message (s'_1) to certain group member s or to the whole group. The individual group members may process the information similarly, but also slightly differently due to personal characteristics (level of involvement, motivation, belief, attitude, knowledge etc.). These individual group members may also consult other sources that diffuse similar or different information (S_2). The current information society includes various communication platforms that allow information audiences to receive information from various sources but

also to actively seek information or exchange information with other individuals (in- or out-group members or even general information sources such as mass media or authorities).

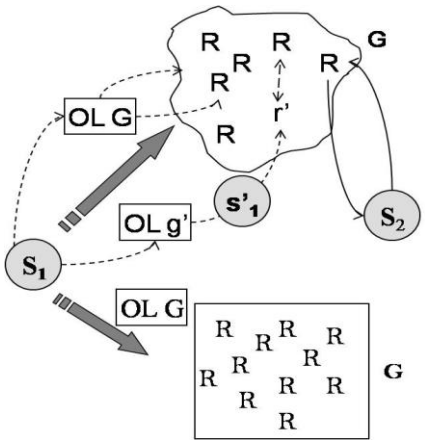


Figure 31: The multi step social interaction perspective

It is indisputable that the information and communication space has become far more complex and that information diffusion and exchange processes can take place much faster and they have a more complex but open nature. This allows people to consult an infinite pool of information, also about risk issues, but on the other hand it is sometimes very hard to deal with this information overflow. That is why opinion leaders, perceived to be trustworthy sources diffusing credible information, may play a very important role in the information selection processes of those individuals. Especially in the context of risks, as socially and medially constructed constructs, opinion leaders can act as information agents in the risk communication processes. Delivering the right target groups with the right information in order to increase risk awareness, stimulate protective behaviour or any other objective that risk communication in a certain risk situation may have, is probably the most significant key performance index in the risk management process. Opinion leaders may be experts with scientific backgrounds as well as individuals that are perceived as experts in the specific risk contexts and that are granted the 'authority to speak and be listened to'.

3.4. Interpersonal communication, personal influence and opinion leadership

Several authors emphasized the importance of interpersonal communication in disseminating information about new products (King & Summers, 1970). However, it is important to stress the difference between interpersonal communication and personal influence. Personal influence refers to the effect of interpersonal communication on future behaviour. The formation of attitudes and decision taking are the result of the combination of information acquisition and processing of experiences. All this can be based on a broad variety of communication media that contribute to the individual's information inventory

(King & Summers, 1970). As Merton states: "If 'influence' referred to any and all alternations of behaviour it would be virtually identical with 'social interaction', since all interaction has an effect, however slight, upon behaviour in the immediate situation" (Merton, 1949).
A central idea that has been tackled by Watts and Dodds is that influentials are important to the formation of public opinion. These authors roughly define influentials as *"(...) a minority of individuals who influence an exceptional number of their peers"* (Watts & Dodds, 2007 p.441). They examine the 'influential hypothesis' by using a series of computer simulations in interpersonal influence processes. They concluded that large cascades of influence are driven not by influentials but by a critical mass of easily influenced individuals.
Burt described the notion of opinion leadership as *"a process of the moving of information from the media to opinion leaders, and influence moving from opinion leaders to their followers"* (Burt, 1999 p.38). So he emphasizes that opinions and trends can be shaped across entire communities. This emphasizes the role of opinion leaders not only as disseminators of information but also as influencers and shapers of opinions, attitudes and probably also behaviour of group members. We might conclude that people who influence others are in their turn also influenced by others, resulting in an interactive exchange situation. So opinion leaders can be both disseminators and recipients of influence (G. Weimann, Tustin, van Vuuren, & Joubert, 2007).
Opinion leadership is a very fascinating concept for communication scientists, both in the expert areas of political communication and interpersonal communication. Since the first appearance of this concept in Lazersfeld, Berelson and Gaudet's 'The People's Choice' (Berelson et al., 1950), the social relationships perspective and the two-step flow model have provided some understanding about how information and ideas are diffused through mass media and interpersonal communication network. We thought that it would be interesting to introduce the concept of opinion leadership within the risk communication process in the context of new risks. New risks are primarily medially and socially constructed. As we might suppose that these personal constructions of reality are merely individual and subjective, we may not underestimate the power of social networking, knowledge sharing and personal influence. Lazersfeld, Berelson and Gaudet pone that in comparison with formal media channels, personal relationships are potentially more influential because of the large coverage and their specific psychological characteristics (Berelson et al., 1950) that will be discussed in 4.7.6. When we interpret this in the construction of risk perception, we can only confirm this statement. However, as the following paragraph will describe, opinion leadership is a concept that has been tackled by scholars from various academic disciplines.

3.5. The multidisciplinary approach to opinion leadership

Boone considers the Erie County study of Lazersfeld, Berelson and Gaudet (1948) together with the Decatur study (Katz & Lazersfeld, 1955), the Elmira study of Berelson, Lazersfeld and Mc Phee (Berelson et al., 1954) and Merton's more functionally oriented Rovere study (Merton, 1968) as the four main pioneer studies that scrutinized the concept of opinion leadership and the two-step flow of communication (Boone, 1971). Up till now, most researches about opinion leadership study the personal influence processes (Erie County, Elmira, Decatur) or the information diffusion processes in the domains of political communication and political behaviour (Berelson et al., 1950; Katz & Lazersfeld, 1955; E. C. Nisbet, 2006; Roch, 2005), public health (Doumit, Gattellari, Grimshaw, & O'Brien, 2007; Kelly et al., 1991; Moore et al., 2004; Soumerai et al., 1998) marketing and consumer behaviour (K. K. Chan & Misra, 1990a; Coulter, Feick, & Price, 2002; Shoham & Ruvio, 2008; Sohn, 2005; Summers, 1970; Van den Bulte & Joshi, 2007; Vernette, 2004) and the diffusion of innovations (Coleman et al., 1957; Cosmas & Sheth, 1980; Gatignon & Robertson, 1985; E. M. Rogers, 1995; T.W. Valente, 1999; Watts & Dodds, 2007).

The concept of opinion leadership cannot only be retrieved in various disciplines, scholars have also argued that opinion leadership can either vary by product (King & Summers, 1970) or by category. Some scientists dispute the existence of a generalized opinion leadership trait (Langaard, Crousillat, & Weisz, 1978; Myers & Robertson, 1972). So we may conclude from this broad variety of disciplines that the concept is a very important element in many different types of opinion formation and decision making processes and that social relations are vital elements in the diffusion of information and ideas. In the information exchange processes that we have illustrated in the figure of the multi step social interaction perspective, we notice that we can identify opinion leaders but also individuals that actively seek information from these opinion leaders, from other group members or other sources. They are called opinion seekers. The difference and overlap between opinion leadership and opinion seeking are described in the next paragraph.

3.6. Opinion leaders and opinion seekers: two of a kind?

Opinion seeking is a concept that has been less scrutinized by scholars than opinion leadership. However, some state that opinion leaders cannot exist without opinion seekers (L. R. Flynn, Goldsmith, & Eastman, 1996).

Scholars have observed and concluded that some individuals actively seek opinions from more knowledgeable consumers about products or services (Arndt, 1967, 1968a; Sohn, 2005; Wright & Cantor, 1967) so information seeking about a product is included in many studies as an element of external information search (Beatty & Smith, 1987; Bennett & Mandell, 1969; Punj & Staelin, 1983). However, it would be false to state that opinion seekers cannot be opinion leaders and the other way round. Moreover, opinion leaders have been characterized, and generally are, also opinion seekers (Shoham & Ruvio, 2008).

Engledow et al. first suggested that opinion leaders may also be information seekers (Engledow, Thorelli, & Becker, 1975), but on the other hand, not all seekers are leaders (Arndt, 1968b; Feick, Price, & Higie, 1986; Sheth, 1968; M. R. Solomon, 1992). The concept of opinion seeking was also thoroughly scrutinized and described in the report of Thorelli and Becker (Thorelli & Engledow, 1980). Some view opinion seeking as a co-phenomenon of opinion leadership (L. R. Flynn et al., 1996) whereas some see it as an extreme point on a leadership seeking scale (R. A. Clark & Goldsmith, 2005). Generally we could state that the two concepts are related, but independent. We assume that, in risk contexts, opinion leaders will also be information and opinion seekers since the nature of the topic is rather uncertain. Opinion leaders will be more involved with the risk and they will have stronger motivations to actively seek information and share this information with the people in their own environment. The relationship between opinion leadership and opinion seeking remains rather complex. The following overview of empirical studies illustrate the non-consensual nature of their relationship across the various studies (L. R. Flynn et al., 1996; Shoham & Ruvio, 2008).

	Context	Relationship	correlation
Flynn et al. (L. R. Flynn et al., 1996)	Rock music	Positive	0.23
Girardi (Girardi, Soutar, & Ward, 2005)	Wine consumption	Negative	-0.35
Lassar, Manolis & Lassar (2005)	Online banking	Negative	-0.26
Sun et al. (Sun, Youn, Wu, & Kuntaraporn, 2006)	Music consumption	Positive	0.62
Bertrandias & Goldsmith (Bertrandias & Goldsmith, 2006)	Fashion	Positive	0.26
Clark et al. (Ronald A. Clark, Zboja, & Goldsmith, 2007)	Fashion	Positive	0.31
Shoham & Ruvio (Shoham & Ruvio, 2008)	PC/Software	Negative	-0.56

Table 24: The non-consensual nature of opinion leadership and information seeking across studies

The correlation coefficients illustrate that the relationships can be both positive and negative, and varying in strength. We can conclude that, depending on the specific context, the relationship between opinion leadership and information seeking can vary strongly in different contexts. As concerns the relationship between the two concepts in the context of risk, we assume that the correlation will be positive. In the empirical body, we will primarily focus on the opinion leadership concept, since this group of people may play a vital role in the risk communication strategies. That is why we will now discuss the concept more extensively.

3.7. Opinion leadership

3.7.1. Definition of opinion leadership

Defining opinion leadership is not easy as some scholars strongly emphasize the aspect of influence (Katz & Lazersfeld, 1955; E. M. Rogers & Cartano, 1962). Katz and Lazersfeld originally defined opinion leadership as *"the individuals who were likely to influence other persons in their immediate environment"* (Katz & Lazersfeld, 1955 p.3). This definition remains in use, more or less unchanged (Grewal, Mehta, & Kardes, 2000).

Rogers and Cartano define opinion leadership as the degree to which the individual is able to influence informally other individuals' attitudes or overt behaviour in a desired way with relative frequency (Rogers & Cartano, 1962). Rogers elaborates on the traditional definition of opinion leaders being the individuals from whom others seek information and advice. He adds the characteristic of influencing others in approving or disapproving new ideas and applies this idea in the context of the diffusion and acceptance of innovations. So Rogers defined information seeking and sharing as a second essential component of opinion leadership, besides the concept of influence. Some authors do not restrain this concept of influence. Dröge and Lerg (Boone, 1971) use the term 'information leaders' instead of 'opinion leaders', which implies the disconnection from the personal influence aspect. They link the opinion leadership principle with the gate keeping concept. Also Klapper attributes the opinion leaders the role as information transmission agents or interpreters (Klapper, 1960). Rogers & Cartano attribute the existence of opinion leadership to the need of the followers to obtain information and advice to create or validate their own opinions (Rogers & Cartano, 1962). According to us, opinion leadership is primarily about disseminating information to connected individuals (through personal contact or even virtual networking). So in our view, the primary role of the leader is the role as information transmission agent, retrieving, disseminating and exchanging information. The second role that we can address to an opinion leader is the role as interpreter. However, the second role is not always manifest. The role as interpreter includes a potential for altered message content, since the interpretation of the information that the opinion leader has received is subjective and will probably also be assessed and compared to knowledge that he has already gained. Naturally, we do not want to neglect the influential dimension of the opinion leadership construct. A lot of scholars, particularly in the field of public health practices, also relate the concept of opinion leadership to the concept of change agents (Kelly et al., 1991; Lomas et al., 1991; C. L. Perry, Klepp, Halper, Hawkins, & Murray, 1986; Soumerai et al., 1998). This indirectly implies that opinion leaders can influence people and induce change in beliefs, attitudes, behavioural intentions or even concrete behaviour. But it depends on the nature of the receiver whether he or she will be influenced by the opinion leader.

As the terminological and conceptual history of opinion leadership is very confusing and depending on the concrete context, it is important to create a clear definition of the concept

in our own research context. In the context of risk communication, we define the concept as follows:

Opinion leaders are information transmission agents that seek, receive, interpret and transmit information to other individuals that are in personal (direct) or impersonal (through other channels such as the internet) contact with them. Depending on the specific personality traits and information needs of the people that receive information from or seek information with them, opinion leaders may have an influence on these information receivers.

Now that we have defined our perspective on the opinion leadership concept, we will argue why it is so important to study them.

3.7.2. Why study opinion leaders?

In risk communication strategies, a lot of emphasis is usually put on the media strategies in the assumption that messages will reach their target groups most efficiently by means of these communication channels. However, we have highlighted the importance of interpersonal communication, especially in the context of risk communication. Interpersonal communication and opinion leadership are crucial thought to take into account when efficient risk communication strategies have to be put up. We will prove the necessity and importance to take these opinion leaders into account. Long time ago Van Den Ban concluded his article with the following findings (Van den Ban, 1964). His conclusions are in fact quite easily reconciled with our risk communication context:

- Mass media are important institutes to arouse the interest in new methods early in the adoption process, but personal contacts and interpersonal communication are especially influential in the decision to adopt the new methods. Also in the context of risk decisions interpersonal communication and information retrieving via opinion leaders may contribute to the risk decision process.
- The first persons to adopt a new idea make intensive use of all sources which can provide reliable information about the idea. Both personal contacts as mass media are included in their sources. So opinion leaders will also make part of the source horizon and even be a primary source due to their high perceived credibility compared to other sources.
- Problems that are untransparent will often make people turn to the knowledgeable people in their environments: the opinion leaders. They are perceived to be the best informed people about the topic in the community. Especially the ‘new risks ‘such as terrorism and the financial crisis are contexts in which people will try to retrieve information and feel more in control from their personal contacts.
- However, on most new ideas, people will not feel an urgent need for information. In this case, people will retrieve their information through personal contacts. As the

descriptive statistics of the empirical studies will illustrate, only a very small portion of people are actively seeking information about risks. They will rather adopt information from people in their personal environment, including opinion leaders.

As described in chapter one, Kasperson and Kasperson stress the fact that the majority of the civil population acquires information through information systems (mediated, indirect experiences) and through interpersonal, direct experiences (R. E. Kasperson & Kasperson, 1996). Certain risk communicators, such as the media and opinion leaders, are information agents that can amplify or attenuate risks. It is therefore important to identify these information agents as they may play a vital role in risk communication strategies. We find it of vital importance to study opinion leadership in the context of risk communication because of the crucial role they play in the risk management process. Since every risk context will probably have a different opinion leadership profile, it is essential to be able to identify the opinion leaders on the one hand and construct their specific socio demographical and media profiles.

Before moving to the classification of opinion leaders and the methods how to identify and scrutinize opinion leaders, we will first provide an overview of the pioneer studies of opinion leadership. They are all discussed in detail by Boone (1971). The subjoined table on the next page summarizes the five key studies between 1940 and 1955. These studies have served as the basic works for many scholars that are active in various disciplines, as mentioned in 3.5.

The Erie County study is considered as the first study that has introduced the concept of opinion leadership. Lazersfeld, Berelson and Gaudet were the first to introduce the two step flow hypothesis and to scrutinize and confirm that influences of mass media is limited and that interpersonal communication and personal influence play a vital role in the formation of attitudes and opinions (Berelson et al., 1950). The table also mentions the different research methods that were used to identify and describe opinion leaders. Both qualitative (interviews, case study) as quantitative research methods are possible but differ in the nature of their outcome.

Study	Period	Researchers	Method	Key finding
Erie County study	1940	Lazersfeld Berelson Gaudet	Panel study	New survey design, longitudinal Limits of media influence, importance of personal influence Two – step flow theory, opinion leadership concept
Rovere Study	1949	Merton	Case study	First typology of opinion leaders - Real vs. Potential opinion leaders - Local vs. Cosmopolitan opinion leaders - Monomorphous vs. Polymorphous opinion leaders
Elmira Study	1954	Berelson Lazersfeld McPhee		
Decatur study	1955	Katz Lazersfeld	Interviews	Three dimensions related to the position and functioning of opinion leaders - Position on the social ladder - Position in the life cycle - Gregariousness: extend of social contacts
The Drug Study	1955	Menzel Katz	Interviews	Dominance of personal influence over media influences in the context of the adoption of new drugs

Table 25: Overview of the pioneer studies of opinion leadership

3.7.3. Classification of opinion leaders

The first typology of opinion leaders was developed by Merton in the Rovere study (Gabriel Weimann, 1994). He distinguished the following classifications of opinion leaders:

- **Real** and **potential** opinion leaders: depending on the phase of personal influence.
- **Momomorphous** and **polymorphous** opinion leaders: depending on the sphere of influence (politics, marketing, etc.).
- **Local** and **cosmopolitan** opinion leaders: depending on their location and influential range.

The latter classification is very characteristic for the period in which the concept of opinion leadership was defined. The main criterion for this classification is their orientation towards their community and their larger society. It uses four dimensions:

- **The structure of social relations**
  This includes the extend in which the opinion leader is bound to his community and the structure of their social networks. Cosmopolitans have a more selective pattern of social contacts and locals are concerned with the quantity of contacts.
- **The avenues to influential status**
  The cosmopolitan's credentials are located in their prestige and authority while the local opinion leaders rely on his social ties, social record and his ability to get social recognition.
- **The exercise of influence**
  Cosmopolitans are perceived by Merton as being greater experts (more knowledge) but less personal whereas local opinion leaders are depicted as more familiar and greater listeners (more understanding).
- **Utilization of mass media**
  The last dimension that is used to distinguish the two types of opinion leaders as formulated by Merton is the use of mass media and the difference in information needs. The general conclusion is that locals rely more on their interpersonal sources and prefer reported news while cosmopolitans use more analytical news with a broader scope (world news) using various types of mass media.

These dimensions and the resulting classification were very valid in its own context and time frame. However, we cannot use these dimensions to classify opinion leaders in our contemporary information society because of the following reasons.
The **structures of social relations** have changed tremendously. The majority of people in contemporary western societies live in a multimedia environment, have access to a very diverse horizon of information and communication sources and channels and have the

opportunities to connect to far more networks, communities and individuals, covering the entire world. This global interconnectedness allows people and opinion leaders to be cosmopolitans.

The **avenues to influential status** have changed content wise. We could state that opinion leaders now find satisfaction in both prestige and authority as social recognition. Space does not matter anymore.

The **exercise of influence** dimension has changed as well because of the disappearing of 'localness'. Since all potential opinion leaders have access to a vast amount of information, the knowledge that can be gained is equal. The global interconnectedness may also limit the difference between familiarity since the proximity condition to gain familiarity and confidence has changed as people can live far apart but still be very close.

The last dimension has probably become the most important one to base classifications on. Since the possibilities of **information channels and media** has changed tremendously during the last decades, people and more specifically opinion leaders will need to define their information needs very securely. The selection of information sources will depend on the specific information needs and the desired level of credibility of the information that is offered. The boundaries between interpersonal sources and mass media have become very vague since interpersonal communication is increasingly taking place through mass media technologies. The rising possibilities for interactive communication and information exchange between individuals and between individuals and authorities have induced a new mode of decision taking where the public can be (pro) actively involved in (risk) decision processes (constructing solutions and proposals, evaluating and decision taking).

We suggest classifying opinion leaders based on their concrete information seeking behaviour and their intensity of their social behaviour. We will also add a component that refers to the influential aspect of opinion leadership.

Classifications of opinion leaders will strongly depend on the underlying methodology and even statistical methods. That is why it is important to provide information about the existing methods to scrutinize opinion leadership.

3.7.4. Methods of studying opinion leadership

Lazersfeld, Berelson and Gaudet (1952) were the first to propose a methodology to measure opinion leadership. They stated that an index of personal exposure needs to be created. This index could be compared to the media exposure indices and would consist of a systematic inventory of the numerous personal contacts and discussions the opinion leaders and followers had over a certain sample of days.

Several other authors (Rogers & Cartano, 1972; Gabriel Weimann, 1994) refer to four main methods of identifying opinion leaders:

1. The Sociometric Method
2. The Informants' Ratings Method
3. The Observation Method

4. The Self-designation Method

Weimann even added two more methods (G. Weimann et al., 2007)

5. The Positional method
6. The Reputational method

The **sociometric technique** identifies the opinion leaders in a certain population by asking the members to whom they address themselves to retrieve information. The method was first founded by Moreno in the 1950s to map social ties, individual positions in groups and social ranking according to number of preferences (Moreno, 1953). Sociometric designs can be used to identify opinion leaders through the eyes of the followers. The main critique on this method is that we might question its face validity and the fact that it can only be applied in smaller groups as all group members need to be questioned. Some examples of research based on the sociometric technique are the studies performed by Rao and Bhaskaran, Granovetter and Weimann (Gabriel Weimann, 1994).

The **informant's ratings technique** uses key informants who will identify the opinion leaders. In this way, the researchers do not have to interrogate the entire group. This method was used to identify opinion leaders in the context of health innovations by Puska et al., Van den Ban studied opinion leadership in three Dutch rural communities using both the sociometric as the informants ratings method (Van den Ban, 1964 in ; Gabriel Weimann, 1994). The limitations of the second method are the uncertainty about the representativeness of the informants one chooses to represent the entire group and its limited suitability for empirical research in small groups with known boundaries and limited usefulness in the study of large social communities (E. M. Rogers & Cartano, 1962).

The **observation method** is limited to small social units as well, as the observer monitors the group's activities and investigates communication behaviour in order to describe the information and communication flows within the group and the influence of certain individuals within the group. Kelly used this method to identify key opinion leaders in the context of HIV risk behaviour (Kelly et al., 1991).

The fourth method, **the self-designating technique**, will use validated scales to identify opinion leaders by means of surveys. We will discuss this method more extensively in 3.7.5.

The **positional method** assumes that elected or appointed positions in the community are opinion leaders. This technique is cheap because the opinion leaders are easily identified but of course, it can be highly inaccurate because it assumes that opinion leadership is solely based upon position.

The **reputational method** uses the nominations of selected individuals on e.g. 'the ten most influential persons in this community regarding a certain issue'. It is a more accurate method than the previous one because the researcher is getting information from various sources.

Valente and Pumpuang categorized close to 200 studies that have studied or used opinion leaders to promote behaviour change into 10 methods. The subjoined overview offers a complete summary, including the advantages, disadvantages and sample instruments for each (T. W. Valente & Pumpuang, 2007). The subjoined table offers an overview of the

methods, techniques, advantages, disadvantages and instruments used for identifying opinion leaders.

Methods, Techniques, Advantages, Disadvantages and Instruments Used for Identifying Opinion Leaders				
Method	**Technique**	**Advantages**	**Disadvantages**	**Instruments**
1. Celebrities	Recruit well-known people who are national, regional or local celebrities	Easy to implement Pre-existing opinion leaders High visibility	Contradictory personal behaviour Difficult to recruit	Media or individuals identify
2. Self-selection	Volunteers are recruited through solicitation	Easy to implement Low cost	Selection bias Uncertain ability	Individuals volunteer for leadership roles
3. Self-identification	Surveys use a leadership scale and those scoring above some threshold are considered leaders	Easy to implement Pre-existing opinion leaders	Selection bias Validity of self-reporting	Opinion leadership scales
4. Staff Selected	Leaders selected based on community observation	Easy to implement	Staff misperceptions Leaders may lack motivation	Staff determines which persons appear to be opinion leaders
5. Positional Approach	Persons who occupy leadership positions such as clergy, elected officials, media and business elites	Easy to implement Pre-existing opinion leaders	May not be leaders for the community Lack of motivation Lack of relevance	1. Do you hold an elected office or position of leadership? 2. Are you a member of any community organizations? Which ones?

Methods, Techniques, Advantages, Disadvantages and Instruments Used for Identifying Opinion Leaders				
Method	**Technique**	**Advantages**	**Disadvantages**	**Instruments**
6. Judge's ratings	Knowledgeable community members identity leaders	Easy to implement Trusted by community	Dependent on the selection of raters and their ability to rate	Persons who are knowledgeable identify leaders to be selected and rate all community members on leadership ability
7. Expert identification	Trained ethnographers study communities to identify leaders	Implementation can be done in many settings	Dependent on expert's ability	Participant observers watch interaction within the community and determine who people go to for advice
8. Snowball method	Index cases provide nominations of leaders who are in turn interviewed until no new leaders are identified	Implementation can be done in many settings Provides some measure of the social network	Validity may depend on index case selection It can take considerable time to trace individuals who are nominated	Those nominated or a random selection of those nominated are also asked this question
9. Sample sociometric	Randomly selected respondents nominate leaders and those receiving frequent nominations are selected	Implementation can be done in many settings Provides some measure of the social network	Results are dependent on the representativeness of the sample may be restricted to communities <5000 members	Randomly selected sample or cases are asked who they go to for advice
10. Sociometric	All (or most) respondents are interviewed and those receiving frequent nominations are selected	Entire community network can be mapped May have high validity and reliability	Time consuming and expensive to interview everyone May be limited to small communities (< 1000 members)	All respondents are asked who they go to for advice

Table 26: Overview of the methods, techniques, advantages, disadvantages and instruments used for identifying opinion leaders (T. W. Valente & Pumpuang, 2007)

We have opted for the self-designation method in our empirical research as it measures the individual's perception of his opinion leadership "level", which will eventually affect his behaviour and attitudes.

3.7.5. The self-designation method and the use of measurement scales

The self-designation method requires the development or the implementation of solid and valid measurement scales. Several authors have developed multiple item measurement scales that aimed to measure the concept of opinion leadership.

The original opinion leadership scale of Lazersfeld et al. (1948) consisted of two questions: 'Has anyone recently asked you for advice on a political question?' and 'Have you recently tried to convince anyone of your political ideas?'. Rogers (1961) added 4 questions and customized the scale to the context of the diffusion of new ideas among farmers in Ohio.

Childers tested and validated a revised opinion leadership scale with 7 items with an internal consistency of 0.79 (cronbach's alpha) but came to a revised scale with six items (alpha = 0.83) (Childers, 1986). The Childers's version of King and Summers opinion leadership scale is probably the most common self-report scale, even though some authors think that it is rather a tool to measure the engagement in social communication than a measurement of the influence of opinion leaders (L. R. Flynn, Goldsmith, & Eastman, 1994). Measuring influence is a very complex assignment. When self-designation methods are used, we do not measure the actual strength of potential influences of an individual, but we scrutinize the degree in which the individual (potential opinion leader) perceives himself as an influencing source of information. Measuring and mapping the specific flow of influences and the direction and strength of influences requires other methods (e.g. judge's ratings, expert identification or sociometric techniques) and more in depth and qualitative analyses.

Weimann and his colleagues critically screened and tested the Personality Strength scale in the context of a traditional community (G. Weimann et al., 2007). The personality strength scale had been used in several studies as an instrument to identify opinion leaders. The personality strength scale was created by the Allensbach Institut, headed by Noelle-Neumann, and was based on numerous questionnaire items related to self-perceived levels of personal influence. However, Weimann proved empirically that the PS scale did not identify the influentials and on top of that, it did not correlate with assumed opinion leadership traits.

Rogers and Cartano provided the roots for the King and Summers opinion leadership scale (King & Summers, 1970). Besides the development of solid instruments to identify opinion leaders, scholars also focused on the motivations for opinion leadership (Dichter, 1966), measurement issues (Childers, 1986; L. R. Flynn et al., 1994; King & Summers, 1970) and the outcomes of opinion leadership (Bloch, 1986).

Flynn et al. developed and validated a multiple-item self-report scale to measure opinion leadership and opinion seeking for specific product or service domains. By means of 5 separate studies, they provide evidence for the uni-dimensionality, reliability and construct-

and criterion related validity of the two final scales. The final scale for measuring opinion leadership included 6 items (cronbach's alpha = 0.86) and the scale to measure opinion seeking included the same amount of items (cronbach's alpha = 0.87).
In the context of risk communication, the identification of opinion leaders in communities has primarily been scrutinized in the context of AIDS (Caceres, Celentano, Coates, Hartwell, Kasprzyk et al., 2007; Caceres, Celentano, Coates, Hartwell, Kelly et al., 2007; T. W. Valente, 2006; T. W. Valente & Pumpuang, 2007) and other health care contexts (Doumit et al., 2007). Also in the context of political communication, scholars have recognized the importance of personal influence and interpersonal discussion in the processes of shaping public opinions, political behaviours and idea diffusion (E. C. Nisbet, 2006; E. M. Rogers, 1995; Scheufele & Shah, 2000; Gabriel Weimann, 1994; Yin, 1998). So scientific literature, and especially empirical studies, about opinion leadership in the context of socially constructed risks is very scarce. That is why our second research objective in all quantitative survey studies in the empirical body is:

The creation and validation of a typology of risk information seekers that is consistent over risk contexts. The second part of this objective is to identify the opinion leaders in the various risk contexts and to construct their general and media profiles so that this group of people, that is the primary target group for the risk communication programs, can be described and reached effectively by means of customized messages that address their specific risk information needs through the sources channels that are mainly used an trusted by them.

Opinion leadership has been previously defined as exhibiting three primary dimensions: social embeddedness, information-giving, and information-seeking behaviours (Coleman et al., 1957; L. R. Flynn et al., 1996; Gabriel Weimann, 1994). Cross-cultural research on opinion leadership has noted that the nature and type of information-seeking behaviours are the most culturally contingent of the three dimensions (Dawar, Parker, & Price, 1996).
Huntington performed several studies in which he tried to categorize health information consumers into various groups and profile them according to various traits (Huntington, Nicholas, & Williams, 2003; Huntington, Nicholas, Williams, & Gunter, 2002). Huntington discovered four groups: active traditional information users, passive traditional information users, electronic isolated users and electronic sociable users. So the clustering was primarily based on two traits: level of active information behaviour and social behaviour. In our empirical findings, we will come to similar conclusions.
Our approach to identify opinion leaders in large samples is still somewhat different. As the empirical chapter points out, our classification of information seekers (or non-seekers) is based on three main characteristics that combine both theoretical perspectives of opinion leadership as perspectives of information seeking behaviour in risk contexts. The three determining dimensions are information seeking behaviour, social behaviour and the specific opinion leadership item(s) that measure perceived influence.

- **Information seeking behaviour**, split up in active information seeking, event-triggered information seeking and passive information scanning.
- **Social behaviour**, expressed in the frequency of talking to others about the involved risk context
- **Specific opinion leadership traits: influence**. In these first surveys that we conducted, this trait was measured by means of one specific item:

"In conversations, my friends, colleagues, family… attach much importance to my opinion concerning (…the risk context…)."

Although we assume that opinion leadership profiles may vary strongly across different risk contexts, we summarized some key empirical findings in the next section.

3.7.6. Characteristics of the opinion leaders

3.7.6.1. Percentage of opinion leaders

The percentage of opinion leaders in previous studies varies greatly depending on the used methodology: the research context, the formulation of the questions, and the way in which they are identified. Of course, the issue arises that we can only determinate the percentage of opinion leaders or influentials in relationship with the precise definition that is being used. Some classical studies suggest that individuals who directly influence more than three or four of their peers should be considered influentials (Coleman et al., 1957; Merton, 1968), while market research studies have concluded that this number rise as high as 14 (Burson-Marsteller, 2001).

Some researchers define influentials in relative terms: some authors define influentials as those who score in the top 32% of an opinion leadership test (Coulter et al., 2002). Engledow et al. related the concept of opinion seeking and leading and identified 42% of their sample as opinion seekers (Engledow et al., 1975).

The amount of self-reported opinion leaders is 21% in the ECS study and 22,1% in the Elmira study (Boone, 1971). It is very hard to proclaim an overall number of opinion leaders. However, Boone states that, in the political domain, we can considerate the amount of one opinion leader per 3 or 4 persons as realistic (Boone, 1971).

3.7.6.2. Characteristics of opinion leaders

Weimann uses the early empirical opinion leadership studies as a foundation to define some characterizations of opinion leaders (Gabriel Weimann, 1994):

- Opinion leadership is independent of sex, age groups and all social levels but in most areas opinion leaders influence people from the same social level
- They take part in various social activities and social organizations

- They are considered experts in their field by friends, colleagues, family and take central positions in their personal networks
- They are more exposed to mass media
- They are interested, involved in the field in which they are influential. We might deduct from this that opinion leaders are heavy information seekers in their field of interest
- They tend to be more monomorphous than polymorphous
- They are more involved in formation and informal personal communication than non-leaders
- They are aware of the fact that they are important sources of information and influence for their peers. The latter characteristic might illustrate that the self-designation method should not be underestimated as a reliable method for the identification of opinion leaders.

Of course, the characteristics of opinion leaders depend on the socio- economical context in which they are defined as the social structures within a society and the interpersonal communication flows change according to the resources they possess: media, time etc.
Lazersfeld, Berelson and Gaudet present five psychological characteristics that make personal influences effective. Some of these characteristics can also be used in the context of risk perceptions (Berelson et al., 1950). The first characteristic is non-purposiveness. Personal contact is much more casual and non-intrusive. We might suppose that people who do not actively seek risk information or passively process risk information from media may be isolated from general risk information. However we must realize that they can hardly avoid information that is spread through personal contact and interpersonal communication. One can avoid media exposure, but if there is extra media attention for certain topics about terrorism or the terrorist threat it is very hard to avoid the discussions that are be triggered by the dominance of the media attention to this media topic. Lazersfeld et al. confirm this by stating that personal influence is more pervasive and less self-selective than the formal media (Berelson et al., 1950). Besides the non-purposiveness we can also add the non-persuasiveness trait of the personal contacts. People who are occasionally encountered with information about terrorism and the risks involved through personal contact will be less suspicious because their information source has no persuasive intentions. A third trait is trustworthiness. In the current information society, people must, actively or passively select and interpret information from various information sources. Especially the internet has a lot of advantages in the process of information gathering and interpreting: people have access to an infinite amount of information from all over the world. They can achieve information from their personally selected sources, and they will mostly select information which confirms their own perceptions. However, the credibility of this information will not be very high. Some people will put reliance upon their personal contacts to construct their own risk society. These personal contacts they rely on will mostly be defined as the ‘opinion leaders’. Trust in these persons’ points of view will be dependent on their status as a risk information

agent. The greater the degree of conformity, the higher the status as an opinion leader will be. So people will be more influenced by people who they perceive as being well-informed and capable of providing them with trustworthy information about terrorism.

Rogers and Cartano (1962) also extracted three generalizations about opinion leaders. Opinion leaders deviate less from group norms than the average group member, so they exemplify the values of their followers. There are two types of opinion leaders: most of them are monomorphic: these people have a limited amount of expertise domains. The second type of opinion leaders is polymorphic: he has several areas of expertise and influence. The general opinion leaders has a high level of social participation and they are likely to use more impersonal, technically accurate sources of information (Rogers and Cartano, 1962 p 437).

In their study of influentials, Keller and Berry have empirically confirmed higher levels of education to be the most definitive demographic characteristic of opinion leaders (Erik C. Nisbet, 2005). Berelson and Steiner and Shah and Scheufele also found similar relationship between opinion leadership and education (Berelson, 1964; Shah & Scheufele, 2006). As mentioned previously, no stable demographic factors have been found to be significantly linked to opinion leadership, especially since the social, cultural, and issue spheres of opinion leadership can vary so widely (Gabriel Weimann, 1994). However, Keller and Berry did note that influentials identified by the engagement model tended to be somewhat older than the general population (E. C. Nisbet, 2006).

Opinion leaders have a greater exposure to mass media than their followers (E. M. Rogers & Cartano, 1962) and some scholars have stated that they are heavy consumers of mass media (E. M. Rogers, 1983; Summers, 1970)

One of the early researchers, Elihu Katz, suggests that there are three criteria to distinguish opinion leaders from non-leaders (Gabriel Weimann, 1994):

- Who one is: includes the description of the personal values of the opinion leader
- What one knows: includes the knowledge and competences of the opinion leader compared to non-leaders.
- Whom one knows: what is their strategic location in their social network.

We chose to use very similar criteria to define our concept of opinion leadership:

- What one knows: we use the specific information seeking behaviour as a distinguishing factor
- Whom one talks to and how frequently: as it is very complex to map the social network of one person in the current information society, we decided that it is better to state that opinion leaders will talk to their peers more frequently about their topics and that the people they talk to is not limited but includes family friends and colleagues. They can definitely be characterized as socially active (Venkatraman, 1990). Either way, consumers tend to regard friends and relatives as more credible and trustworthy than commercial information sources (Childers, 1986). Also Solomon stated that product opinion leaders are innovative and active communicators. Besides purchasing products, they actually communicate both positive and negative information about the products (M. R. Solomon, 1992).

3.7.6.3. Opinion leaders and seekers, their information search profiles and media usage

Besides the identification of opinion leaders, it is important to identify and utilize differing information search profiles and eventually construct the media profiles of these key persons. In the context of product diffusion models, many authors have attempted to identify the opinion leaders en opinion seekers by means of measurement scales (L. R. Flynn et al., 1996), but they also tried to construct their information search profiles (Shoham & Ruvio, 2008). Early studies focused on interpersonal discussion as the primary source of information for opinion leaders, though this emphasis was most likely the result of the limited media density (prior to television, Internet, etc.) of that specific period (Gabriel Weimann, 1994). Katz not only confirmed opinion leaders' generally higher levels of media use and exposure, as mentioned previously, but added an additional dimension as well. He found that across spheres of influence, opinion leaders paid a higher level of attention to media and news specific to that sphere (Katz, 1957). For the use of print media, several scholars have confirmed that opinion leaders tend to use the print media at much higher levels than the general population (K. K. Chan & Misra, 1990b; Shah & Scheufele, 2006; Gabriel Weimann, 1994). The opposite is true when it comes to their television viewing behaviour. Opinion leaders tend to watch equally or less television than average (Levy, 1978; Shah & Scheufele, 2006; Gabriel Weimann, 1994).

3.7.6.4. Opinion leaders in the context of risk communication

The opinion leaders appear to be very important gatekeepers for risk information. Opinion leaders are characterized by their information seeking behaviour and their need to share information with others. Our empirical research will allow us to describe their information needs, their information seeking behaviour and media profiles. We should ask ourselves whether it is necessary to use the opinion leaders as change agents in the context of risk communication practices about new risks. In our opinion, they can play a very important role, especially when we consider them as a crucial link in a multi step social interaction process where they can serve as information transmitters, as gatekeepers or even as information interpreters. Research has indicated that the socio-demographical profiles of opinion leaders vary according to the specific contexts they are scrutinized in. However, we could identify three crucial dimensions that will allow us to differentiate leaders from non-leaders: information seeking behaviour, social behaviour and interpersonal influence. One of the key objectives of our empirical research is to identify the opinion leaders in three different risk contexts and to construct their specific socio-demographical and media profiles. This output may contribute crucial information in the development of effective risk communication strategies.

4. Conclusion

The primary objective of this chapter was to construct the theoretical foundations for our empirical research studies. When constructing risk communication strategies, the first step is to reconcile the actual objective knowledge about the risk with the information about the public risk perceptions. As risk communication efforts are aimed at this public, the public risk perceptions and risk information needs of the various target groups that can be identified are probably even more important. There are two levels of analysis: the individual level and the social level. The social cognitive theory of Bandura merges the cognitive and social perspectives and tries to link them to the behavioural component (Bandura, 2001).

The first part of this chapter focused mainly on the individual or cognitive perspective. Individual risk perception theories such as the psychometric paradigm, the heuristic systematic information processing model and the experiential mode of risk perception clarified the mechanisms that underlie risk perception, but also the role of the media in the construction of risk perceptions was discussed. The next step was to relate risk perception to concrete behaviour. The stronger the preexisting perceived self-efficacy and the more responsible institutes promote and diffuse the idea that people can enhance their control over the risks that surround them, the more people will be convinced of their self-regulative efficacy. One of the main conclusions was that preventive risk practices are stimulated better by a heightened self-efficacy than by elevating fear. Besides the concept of self-efficacy, information search behaviour is of vital importance to our theoretical foundation. Information behaviour consists of three levels: information behaviour, information seeking behaviour and information search behaviour. We discussed the levels by means of various sources that are available. Especially the information seeking level was described into detail because the concepts of active and passive information seeking are the main components of our opinion leadership identification tool. The Framework of Risk Information Seeking model integrates three basic factors that contribute to the awareness of the risk context. It involves the particular perception of the risk, the perceived personal control and the involvement of the individual with the risk context. So it is a nice reflection of our basic perspective that includes the duality of cognitive and social elements. The first part was concluded by formulating empirical and theoretical viewpoints about the general and specific information needs of people in the context of risk perception and more specifically in the context of opaque or untransparent risks. The role of interpersonal sources and interpersonal communication in the information seeking processes was confirmed. Interpersonal communication was considered to be one of the basic elements of the social construction of risk perceptions. This theoretical concept of interpersonal communication was the basic ingredient of the second part of this chapter. The social construction of risks has also been elucidated by several theoretical viewpoints, such as the model of social and medial construction of risks, the social network contagion theory of risk perception. The three basic perspectives on how individual audience members react on and interact with the mass media and their messages have been described as well: the individual differences

perspective, the social relationship perspective and the social categories perspective. We concluded the summary with an upgraded model, the multi step social interaction perspective since the previous three models did not provide us with a satisfactory answer to the contemporary needs. We added concepts of interactivity, non personal direct information flows, possibilities of new and interactive information sources and feedback loops. The crucial focus within the second part however was on the opinion leadership construct. After explaining the multidisciplinary character of the construct, pointing out the difference with opinion seeking and constructing an own definition of opinion leadership in the context of risk communication, we provided an overview of the first studies of opinion leadership and summarized the main methods to scrutinize the construct. We concluded by providing the reader with some general characteristics of opinion leaders that were empirically confirmed in various contexts. We were also able to identify three crucial dimensions that will allow us to differentiate leaders from non-leaders: information seeking behaviour, social behaviour and interpersonal influence. One of the key objectives of our empirical research is to identify the opinion leaders in three different risk contexts and to construct their specific socio-demographical and media profiles. This output may contribute crucial information in the development of effective risk communication strategies.

PART TWO

EMPIRICAL BODY

CHAPTER FIVE

GENERAL INTRODUCTION TO THE EMPIRICAL BODY

1. General introduction to the empirical body

This empirical component offers the coherent research reports of the research that has been completed during the period of 2004-2009. The final aim of the reports is to provide a clear overview of the research topics, objectives, methodologies and results of the 8 studies that have been performed in the broad context of risk perception and risk communication. The final chapter will try to present an overall summary of the results of the 8 studies that will be the foundation of the general managerial recommendations that can be used to construct effective and generic risk communication strategies in various risk contexts.

What pulled the trigger

On demand of the NATO Human Factors & Medicine Research and Technology Experts Group (HFM-140/RTG) on the Psychosocial, Cultural and Organizational Aspects of Terrorism, we developed a conceptual measurement model of psychological resilience in the face of terrorism: Resiscope©. By means of the first, exploratory large scaled survey study, the 'Al Resilience Task Force'[5] constructed an eight-dimensional conceptual model for psychosocial resilience in the face of a terrorist threat. Six dimensions – attitudes toward governmental initiatives, personal preoccupation, perceived risk and fear, knowledge, mental distance and social support – relate specifically to terrorism. The other two dimensions – major life stressors, personal and social resources – have a general nature. As this was a broad exploratory study no specific hypotheses were put forward, only some assumptions abstracted from previous research on different parts of the model. Each of the dimensions could serve as input, output or mediator variable for the others, in the end all contributing to psychosocial resilience in the face of a terrorist threat. The fundamental aim of 'ResiScope' at the Department of Communication Studies at Ghent University was to connect the two main weapons in this psychological warfare: psychological resilience of the general population on the one hand and risk communication strategies on the other hand.
The first study was a pilot study: a broad exploratory study that had to reveal the underpinning concepts of resilience in the face of terrorism. However, the final aim of this PhD was not to dig into the field of coping and personal and communal resilience. The concept of resilience has many links with the risk communication discipline. So within the

[5] "The Al Resilience Task Force" is a task force that was set up in 2004 and that consisted of Prof. dr. Gino Verleye, Isabelle Stevens, Pieter A. Maeseele, Griet Verhaert, Sarah Timmerman, Mike Vandekerckhove and Paul Piedfort.

bedding of resilience and risk communication literature, the inspiration source was retrieved. However, the scope of this doctoral dissertation was not to develop psychometric measurement models for measuring resilience and its underlying drivers in the face of terrorism. The aim was to develop concrete risk communication models and strategies. If we want to develop communication strategies, it is of course indispensible to scrutinize the needs and the profiles of the various target groups, as discussed in chapter four. Besides theoretical grounds for the need for identifying and mapping the specific characteristics and information needs of the various stakeholders, we also found inspiration with Beljon. Beljon developed the Managing Public Confidence wheel (MPC wheel): *"a method to develop a corporate communication strategy even for issues that involve stakeholders with different interests"* (Beljon, 2001 p.269). Firstly, he stressed the importance of stakeholder involvement and integration in the policy decision making process and capability development (integration of knowledge provided by individuals into high-quality and readily available information). Secondly, he stated that the MPC wheel uses the information an output of three sources of information:

- The results of a tracking method among the general public that delivers continuous information on the public perceptions in specific risk contexts.
- The outcome of a media analysis that indicates the agenda, hypes and tone-of-voice of the media covered risk messages
- The input of the FAQ (Frequently Asked Questions) on Internet sites and telephone lines.

Our focus is mainly on his first suggestion: a tracking method that involves continuous monitoring through extensive and representative quantitative research. That is why the studies that followed the first, exploratory study had a different aim: to develop and validate a measurement instrument or methodology that would bring these risk perceptions and the related concepts on the one hand and the risk information needs and profiles of the target groups on the other hand, to the surface. Initially, the first questionnaire with the initial eight dimensions was used again to perform follow-up measurements in the following 3 years, but it was completed with new dimensions and items related to the other scope: risk communication and information needs. That is why the reader will find questionnaires in appendix that are much more extensive, including various items that will not be discussed in this empirical body. After having developed a nice blueprint for the risk communication methodology, we thought that it would be interesting to apply it to other risk contexts, as it would be of great value for governments that they would have a measurement instrument at their disposal that could be used not only in the context of terrorism, but also in various other risk contexts. As we were confronted with the threat of the H5N1 virus or the bird flu in 2005, we thought that it would be appropriate to apply the instrument in this context and scrutinize the risk perceptions and the specific risk information needs in this context. In 2008 the world was confronted with a global financial economical crisis, inducing an intensive and global media coverage that would not only create awareness into the collective minds of national and regional communities, but that would also induce a certain degree of arousal

and anxiety. Even though the risk of the financial and economical crisis differs on various dimensions from the risk of the bird flu and from the namely politically and medially constructed risk of terrorism, we thought that it would be innovating to apply the risk perception methodology in these three contexts and refine the tool so it can be applied to other contexts and deliver an output that can be used as a solid input to create good and effective risk communication strategies.
As discussed in the introduction of this dissertation, the H1N1 virus or 'Mexican flu' is probably the most important threat, as presented by the media, that people are currently facing. Even though the facts and figures indicate that the epidemic threshold is not exceeded yet for the time of the year, there have already been very strong ripple effects on various levels and in various domains of the society.
It would have been very nice to apply our risk perception methodology to this new context, but due to a lack of time and resources we were not able to perform this study. We hope that, in the future, the methodology will be put into practice and it will be able to deliver concrete and tangible input for the development of customized risk communication strategies.

2. Overall research objectives

As described in the first, theoretical part, William Leiss has extensively scrutinized the evolution of risk communication research. In 'Challenges in Risk Assessment and Risk Management' (Leiss, 1996), Leiss describes three phases in the evolution or risk communication research, starting from 1975 (see chapter two, 3.8.1). According to Leiss, in the last, most current phase, risk communication strategies are characterized by the integration of social contexts and social proportions in which risk judgements and risk conflicts take place. The trust issue is very important as well within this context. Relating to this matter, Leiss proposes the following working hypothesis: *"the trust in institutional risk actors (governments and industries) can be accumulated by the devotion of these institutes to communicate responsibly about risks. In this way, this "can put pressure on all players in risk management to act responsibly"* (Leiss, 1996, p. 91). Continuity and a consistent long term communication strategy are basic conditions to communicate efficiently about risks.
Leiss concludes his article with the following statement, that at the same time includes a clear proposition for exploratory and confirmatory research:

> *'A good theoretical framework for Phase III may be found by extending the 'strategic environmental audit' and 'environmental responsibility' approach. This could be operationalized by the formulation of a 'code of good risk communication practice', and compliance with the code could be verified through a 'risk communication audit' designed to meet the test of public credibility. Some of the much needed foundations of trust might be laid in this manner.'*

This conclusion could be the central proposition of the doctoral research project that started in December 2004. The research objectives were twofold:

1. Mapping the social and medial construction processes of the perceived 'new risk society' by means of quantitative survey studies that include the elements of the strategic environmental audit. We must emphasize that the audit includes elements from the theoretical framework of risk communication and risk information processing (see theoretical body). The eventual measurement tool can be used to describe current risk perception levels, risk information needs, fear levels etc. and of course the interrelationships between these concepts. It offers us a clear audit of the environment, and identifies crucial elements for improvement. From the psychometric measurement model that was developed for the NATO to study psychological resilience and its relating concepts, we extracted the key drivers that were the most important to incorporate in our PhD study. The development of the measurement tool was an organic process. Starting from the basic drivers, we decided to add more key driver concepts, based on the literature. We also wanted to validate certain scales and concepts in other untransparent risk contexts such as the bird flu and the recent economical and financial crisis.

2. Development of a code of good communication practices. Based on the information needs of the target groups, that are identified and profiled by means of the quantitative research studies, we already have an idea of our audience. The content of the risk communication efforts will be a reconciliation of the risk information needs of the target audience on the one hand (that are identified by means of the risk perception and information methodology) and the aspirations of the institutes that have set specific objectives for their risk communication programs, depending on the final aims of these programs (informing, providing guidelines, preparing etc.). Besides target group profiles and message contents, it is important to estimate the mode of communication, the communication style and the channels through which the messages ought to be spread. These issues relate directly to the practice of risk communication: 'how to'. It is important to incorporate the essential concepts of source and information credibility. The importance of these concepts has already been revealed in chapter three of the theoretical part. In the empirical body, we will try to connect various message characteristics (style, source, quantity, quality etc.) with the concepts of trust and credibility. Eventually, the outcome of these studies will serve as an input for the creation of effective risk communication messages.

So our key objectives will induce the need to thrust the borders of theoretical framework development to empirical confirmation of the two central needs as formulated by William Leiss. Our empirical journey will primarily focus on the development and validation of our overall underlying measurement framework that will allow us to scrutinize risk perceptions

and all related concepts in various risk contexts. The output of scrutinizing the public by means of this methodology will serve as a valuable input for the development for targeted risk communication strategies. We will discuss the applied research designs with their specific sampling methods more extensively in the research reports.

The subjoined scheme provides us with an overview of the studies performed in the time frame of 2004-2009. It also compares the methods, sample sizes, key objectives and contexts of the studies.

	PART ONE: public oriented						PART TWO: message oriented	
	Research report I				Research report II	Research report III	Research report IV	Research report V
Name study	**Terrorism I**	**Terrorism I**	**Terrorism III**	**Terrorism IV**	**Bird flu I**	**Financial crisis I**	**Terrorism V**	**Bird flu II**
Period	December 2004	March 2005	December 2005	December 2006	April 2006	December 2008	March 2005	April 2006
Method	Quantitative Survey study	Quantitative Survey study	Quantitative Survey study	Quantitative Survey study	Quantitative Survey study	Quantitative Survey study	Experiment	Experiment Concise survey study
Sample	n = 1040	n = 160	n = 851	n = 1558	n = 320	n = 1578	n = 120	n = 417
Key objectives	Descriptive statistics risk perception and related concepts Validation key measurement scales Identification and profiling information seekers Linear relationships between key concepts (correlations) Multivariate relationships risk related concepts						Relationship message characteristics and source and information credibility	Concise descriptive statistics key concepts
Risk context	Terrorism				Bird flu	Financial / economical crisis	Terrorism	Bird flu

Table 27: Overview of the empirical studies in the period of 2004-2009

EMPIRICAL PART ONE

PUBLIC ORIENTED RESEARCH

CHAPTER SIX

PUBLIC ORIENTED RESEARCH

1. Contextual outline and problem statement

As extensively discussed in the theoretical framework, risk communication is a very difficult and complex 'trade' since the risk communication programs have to be carefully constructed, depending on the specific risk context and communication objectives. Communicating about risks is in fact always linked to the management of risk perceptions, as most risks are socially and medially constructed, and the attitudes, behavioural intentions and concrete behaviour will mostly rely on the personal and communal perceptions about the risks. The social amplification and attenuation of risks theory, as described by Kasperson et al. (1996), propagate the theory that ripple effects that pass from a personal to the communal and even global level can induce much larger consequences in the society as a whole. According to this theory, many factors play a role in the social and medial construction of risks. The identification and examination of these factors is very complex as researchers have to have a very multidisciplinary mindset in order to reconcile theories of a psychological, socio-psychological sociological and even political nature. When scrolling through the literature about risk communication it became clear that little empirical research had been done that reconcile the concepts of risk perception and risk communication simultaneously. Also the number of academic handbooks that offer concrete guidelines and refer to the practical implications of risk communication in various contexts is rather limited. Of course, there can be a great overlap with the practice of crisis communication. Again, we want to emphasis that in this doctoral dissertation, we want to make a clear distinction between risk and crisis communication, even though it is not always easy to draw a concrete borderline between the two. During the exploration of the literature about the empirical component of risk communication, we noticed that up till then, there had not been constructed any concrete quantitative measurement instruments that could provide risk communication managers with an extensive and very broad descriptive view on the risk perception concepts and all possible related concepts that could be of importance for the creation of solid risk communication strategies. It soon became clear that the construction process of the risk perception and communication methodology would be an exertion of pioneering and exploring the multidisciplinary boundaries of risk perception and risk communication. That is why we want to emphasis that our methodology has been constructed with items, scales and concepts that are primarily developed and operationalized by us, based on the basic literature and theories about risk perception and risk communication. Our central problem statement is as follows:

What are the key drivers of risk perception and risk communication in various risk contexts? How can we measure them in order to achieve valuable knowledge that can serve as an input for the creation of effective and customized risk communication strategies in various risk contexts?

The first part of the empirical body of this doctoral dissertation consists of three research reports. It covers 6 quantitative studies in 3 different risk contexts. The contexts are: terrorism, the bird flu and the financial economical crisis. We selected these risks as each of them was very much in the spotlight during a certain period of time. Extensive media attention was paid to terrorism, firstly in the aftermath of the attacks of 9/11 and under the legacy of Bush jr., secondly after the attacks in Madrid in March 2004 and in London in July 2006. The bird flu was a threat that gained much media attention in 2005. Since September 2008, the worldwide financial and economical problems have dominated both the medial as the political landscapes as well. Since we wanted to validate our 'methodology' in contemporary and 'new' risk contexts we opted to scrutinize the risks that presented themselves during the course of time and that induce certain perceptions with the general public through the media attention.
In the next paragraphs, we will discuss the overall research objectives of the studies and the used research design.

2. The general objectives of the quantitative studies

Our primary objective is to map aspects of social and medial construction processes of the perceived 'new risk society' by means of quantitative survey studies that include the elements of the strategic environmental audit, as proposed by Leiss. We must emphasize that the audit includes elements from the theoretical framework of risk communication and risk information behaviour (see theoretical part). The outcome is a measurement tool can be used to describe current risk perception levels, risk information needs, fear levels, behavioural intentions and of course the interrelationships between these concepts. The methodology that will be developed and validated will serve as a monitoring tool in the risk management process. As discussed in chapter two, there is a strong need for monitoring as it is a key component of sound governmental risk management processes. Naturally, it was also essential to include concepts about governmental communication and some general concepts about the attitude towards the perceived role and satisfaction with the government as a risk regulator on the one hand (the one that protects) and as a risk communicator on the other hand (the one who communicates) as we assume that the relationship between the two roles may be very elementary and crucial.
The measurement tool should offer us a clear audit of the environment, and should be able to identify crucial elements for improvement. The development of the measurement tool was an organic process. Starting from the basic drivers, we decided to add more key driver

concepts, based on the literature. Of course, most of the items had to be customized to the specific risk context, and some items were added to some scales to make them more complete. But the general 'backbone' of the items and scales remained the same over the 6 survey studies. Eventually, we used the most extensive survey in the context of the financial and economical crisis in 2008. So the first main research objective of the quantitative survey studies could be formulated as follows:

> *The creation and validation of concrete items and measurement scales that measure risk perception and the related concepts that could serve as an input for the development of a concrete risk communication strategy in various risk contexts. The measurement scales should be consistent over the various studies in the different risk contexts so that the items can be used to construct a general risk perception and information methodology that can be used in future risk contexts.*

From the results of a segmentation of information seekers in our first study, we could distinguish four main groups, from which one is of vital importance for the effectiveness of our risk communication efforts: the opinion leaders. The combination of the results about the information seeking and the social behaviour in the first study with the literature and thoughts about applying the concept of opinion leadership in the context of risk perception and communication led us through the creation of a second general research objective:

> *The creation and validation of a typology of risk information seekers that is consistent over risk contexts. The second part of this objective is to identify the opinion leaders in the various risk contexts and to construct their general and media profiles so that this group of people, that is the primary target group for the risk communication programs, can be described and reached effectively by means of customized messages that address their specific risk information needs through the sources channels that are mainly used an trusted by them.*

The third objective is the analysis of the linear relationships between the key concepts that surround risk perception and communication. The correlation tables will allow us to discover the various relationships between these concepts. The outcome of these correlations will allow us to create some structural equation models that will statistically analyze and confirm some multivariate linear constructions that include the most important concepts. So we can formulate the third objective as follows:

> *The creation and validation of multivariate structural equation models that will integrate, statistically analyze and confirm key concepts of risk communication.*

Now we discussed the objectives of the first part of the empirical body, let us now take a look at the research design that we used: quantitative survey study.

3. Research design

3.1. Research method: quantitative survey study

Survey studies are generally used to proclaim valid and reliable findings about the degree in which certain phenomena are present in societies or within certain subgroups on the one hand and the extent in which phenomena correlate. The social survey design is characterized by (Fowler, 1986; Wester, Renckstorf, & Scheepers, 2006):

- The collection of a large quantity of research units (respondents) on one single moment (period) in time. However, only a fraction of the population is involved in the study (sample) but in most cases, this sample will be representative for the population so that results can be generalized.
- The research objects are confronted with one standardized and identical questionnaires that incorporate a large quantity of items so in other terms, the information (data to be analyzed) is collected by asking people questions.

The first type of research questions that can be addressed with survey research are descriptive research questions. The second type includes explanatory research questions. Survey research is also an excellent design to scrutinize subjective issues such as attitudes, opinions and behaviour or behavioural intentions that are not directly observable.
According to Fowler (1986), a sample survey brings together three methodological issues: the sampling procedure, the operationalization phase or design of the questions and interviewing the respondents or collecting the data.
Let us start with the description of the construction of the measurement instrument: the risk perception and information survey.

3.2. The measurement instrument

3.2.1. Operationalization process

As mentioned previously, we opted to use a survey to be able to collect a large pool of data that can be used to describe the phenomenon of risk perception and the related concepts in the context of terrorism. The operationalization phase of the first study was the most intensive and explorative one. We first decided to translate the basic concepts that surround risk perception and communication into concrete items. We opted for closed questions for the following three reasons (Fowler, 1986 p.87):

- Respondents can perform the task of answering the questions more reliably when they are provided with several response alternatives.
- It is easier and more reliable for the researcher to interpret the answers of the respondents as the alternatives are ‘standardized’.

- Open questions often remain unanswered and when respondents do answer, some of these answers are not analytically useful. We also assume that the chance of misinterpretation of the questions diminishes as the response alternatives already indicate and clarify the question as well.

The only open questions we integrated were possibilities for the respondents to add an extra response category e.g. for media usage in case we might have overseen a certain magazine or tv channels that is consulted by the respondent but that we did not integrate in list of response alternatives.

We decided to use Likert scales. As Fowler states: *"Likert is credited for building a bridge between the elaborate scaling techniques developed by psychophysical psychologists for measuring subjective phenomena and the practical requirements of applied social research"* (Fowler, 1986 p.13). The Likert method is appreciated and used by social scientists in various contexts (Guy & Norvell, 1977; van Laerhoven, van der Zaag-Loonen, & Derkx, 2004).

Since most of the concepts have a relatively strong subjective nature, it was recommended to use multiple questions that measure the same subjective state so that scales could be constructed and validated (Fowler, 1986).

During the operationalization phase, we took into account the general guidelines for constructing good and workable questions: they need to be unambiguous, unidimensional (probe only one issue), comprehensible, not too long etc. (Hüttner, K.Renckstorf, & F.Wester, 1995).

When the items were constructed, we created a basic questionnaire with a sober an clear layout. The items were put together according to the concept they measured. The easiest concepts were located in the beginning of the questionnaire, the more sensible and more difficult questions were posed in the middle and the questionnaire was concluded by the socio demographical questions. The next step was to pretest the questionnaire. Five members of our task force collected a total of about 20 questionnaires in the pretest phase ($n_{pretest}$=100). The respondents gave very clear comments about potential misinterpretations, questions with a high social desirability level, unclearly formulated questions, missing response alternatives etc. The output of this pretest phase allowed us to construct an adjusted and improved version of the questionnaire that was ready to be used in the studies. For all additional items that were added in the surveys of the consequent studies, we asked some respondents to provide feedback about these new items.

3.2.2. The concepts: the initial starters' set

Based on our theoretical body, we started with key concepts that were presumable related to the general concept of risk.

3.2.2.1. Risk perception

As risk perception is a very broad and extensively studied theoretical construct, it is very intricate to reduce this concept and its multidimensionality to a some measurable and concrete items. In order to operationalize the concept, we must first give a clear definition of the concept. With our final aim in mind, developing a solid and practical risk communication audit tool, we could state that risk perception includes the subjective or perceived judgments of probability of harm to the person himself, other or the environment (E. F. J. Ter Huurne, 2008). The operationalization may vary according to the nature of the risk.

3.2.2.2. Mental distance

Subjective feelings regarding risks are also related to the mental distance to the risk. The mental distance represents the perceived proximity of the risk to the individual and its personal environment. It reflects whether the individual perceives the risk as something that takes place far from his or her own environment (high mental distance) or whether it can take place in his or her near environment. It is very similar to the concept of risk perception as we defined it, but risk perception is more the reflection of the perceived probability of the risk and perceived level of exposure.

3.2.2.3. Fear

The fear component is a very important construct as it reflects to which degree the individual exposes affective reactions. We ask the individuals to what degree they are afraid that something concrete (may vary according to the risk context) might happen to them. We assume that fear will affect behaviour or behavioural intentions.

3.2.2.4. Attitude towards the government

The attitude towards the government is actually not a real attitude measurement scale that is one dimensional. The dimension reflects the combination of the perception of the government as a risk regulator and the perception of the government as a risk communicator. Firstly, perceived risk regulation includes the degree to which people think that the government and in some risk contexts the services and institutes such as police, fire department, … are prepared to tackle the risk and its consequences. Secondly, it reflects the attitudes of people towards the governmental initiatives to deal with the risks. Of course, this concept has to be customized to the risk context as well as different initiatives and protective measures will arise according to specific risks. So in general, it measures the attitude towards governmental initiatives, perceived competency and adequacy of the government to prevent potential risks and preparedness to reduce negative consequences of those risks, and the attitude towards the governmental risk communication strategy.

We assume that a positive attitude towards the government as risk regulator and communicator will reduce fear levels (protective factor) and perceived risk.

3.2.2.5. Information seeking behaviour

An extensive body of literature points out that media exposure to risks, and in particular terrorist events is an important predictor of symptoms of stress (Terr et al., 1999; Cantor et al., 1993; Pfefferbaum et al., 1999; Pfefferbaum et al., 2001; Pfefferbaum et al., 2000; Pfefferbaum et al., 2003; Apolone et al., 2002; Ray & Malhi, 2005; Ahern et al., 2002; Fremont, 2005; Saylor et al., 2003). Of course, one cannot avoid being exposed to media contents, but we will try to refine the media exposure and try to approach it from the viewpoint of the individual as an information seeker. Information seeking behaviour and the underlying psychological processes were extensively discussed in chapter four of the theoretical body (2.6.4). So instead of assuming that individuals are passive receivers of risk information that are exposed to contents through various media channels, we approach the individual as a critical, more reflecting being that shows various levels of information seeking, ranging from active information seeking to passive information scanning, as discussed in 2.6.4.3 in chapter four.

3.2.2.6. Social behaviour

Originally, we included a general concept of social behaviour, which reflected to which extent one's social network (colleagues, friends, family, etc.) is able to influence perceptions about risks and acts as a kind of buffer. We inquired for opinion leadership, the extent to which people can talk to others about terrorism, and the extent to which people feel sufficiently backed up by their social network in the face of certain risks. Schuster et al. (Schuster et al., 2001) claim that talking to others and discussing your feelings about what happened (mostly as seen on television) proves to be a significant coping strategy, especially with those who experienced substantial stress reactions. In this inquiry we focused more on social buffering than actually identifying attachment figures and styles, but nevertheless it follows this line of reasoning – that healthy and functioning social networks are likely to help the individual to buffer stress caused by perceived risks such as perceived terrorist threat. However as the final aim of our doctoral dissertation is not to scrutinize resilience and its underlying and influencing factors, we decided to reflect on and define social behaviour as a form of information seeking and sharing behaviour. We will eventually integrate the concept of social behaviour into the concept of opinion leadership.

3.2.3. The supplementary concepts

Throughout the life cycle of the research processes, through exploratory analysis, we found out that the original set of concepts that made part of the aura of risk communication could

be completed with some other concepts that arose from the first exploratory studies. Especially the concepts of governmental communication and opinion leadership were intensively deepened by adding new related concepts and items.

3.2.3.1. Specific risk information needs

As one of the main objectives of the empirical body is also to create a employable tool to create effective and target oriented risk communication strategies we decided to integrate the need for specific risk information types.

3.2.3.2. Perceived roles of government

As we came up with the importance of the government as a risk regulator on the one hand and as a risk communicator on the other hand, we decided to integrate three questions that measure to what extend people think that the government should protect the public by taking concrete protective actions, they should provide the public with general risk management guidelines and to what extent they should provide general information about the risk.

3.2.3.3. Reliability risk information sources

In some studies the perceived reliability of the most common risk information sources will also be measured and discussed as we assume that trust strongly relates to risk perception.

3.2.3.4. Suitability specific governmental risk information channels

In some studies, the evaluation of the suitability of the specific governmental information channels will be measured and discussed. This information will provide us with information about the perceived suitability and reliability of communication channels to diffuse risk information.

3.2.3.5. Need for participation in the communication process

The perceived need for active participation in the governmental communication processes was clearly present in the results of our first studies. In the literature, academics have also dedicated a lot of attention to the rising and increasing two-way nature of the information and communication flow between governments and the public. Both the perception of the possibilities people have to interact and communicate as the need to participate in the communication process are included.

3.2.3.6. Opinion leadership

The concept of opinion leadership has been extensively discussed in chapter four of the theoretical body (3.7). The first exploratory survey study also provided us with a segmentation of information seekers. This segmentation was based on the concepts of information seeking, social behaviour and one general item that reflected the typical influential characteristic of opinion leaders. The segmentation revealed four groups of information seekers and this result was confirmed and validated in the first five survey studies we performed. We decided to add some extra items in the last study concerning the financial and economical crisis. As opinion leaders play a key role in our risk communication strategies, we decided to create the specific socio - demographical and media profiles for the four groups of information seekers. General descriptive statistics will also be discussed specifically for opinion leaders and differences between opinion leaders and the other people will be integrated in the tables. The information needs profiles will also be described for opinion leaders as well as non-opinion leaders.

3.3. Sampling

As resources were limited, we could not draw a completely at random sample from a predefined sampling frame. We decided to follow the quota sampling procedure and let our interviewers (students) select respondents that yield the same proportions as the population proportions on the key identified variables: gender, age and educational level. Quota sampling is a non - probability sampling design that has many similarities with probability sampling, in particular with stratified probability sampling but it differs in the fact that the interviewer selects his respondents rather subjectively, just like in a convenience sample where the interviewer selects individuals who are readily available and prepared to participate in the study (Henry, 1990). Stuart (1984) has pointed out three major issues to take into account when using the quota sampling design: the danger for selection bias as the interviewer selects its respondents subjectively, there is no waterproof method of estimating the standard error of a sample estimate because of the ill-defined procedure for selecting the sample and finally quota sampling could also be suspected to conceal the non-response (Stuart, 1984) as people who are not willing to participate will not be included in the study and results. It is important to bear these critical reflections into mind.
The students that followed the course ‘Mass Communication Research’ had to collect 6 surveys; taking into account the primary selection variables: gender, age and educational level. We guaranteed the respondents that their answers would be treated confidentially and that only the researchers that conduct the study would ever be able to associate individual respondents with their answers. In an accompanying letter, we guaranteed the anonymity of the respondents, however, we did ask for telephone numbers as we wanted to perform random cross checks to make sure that the students did not fill the surveys out

themselves. Doubtful cases were deleted from the final files. The subjoined scheme is an overview of the sampling specificities.

Study	N students	N respondents	N respondents after data cleaning
Terrorism I	101	1140	1040
Terrorism II	8	160	160
Terrorism III	133	1064	851
Terrorism IV	267	1602	1558
Bird flu study	36	324	320
Financial economical crisis study	280	1680	1578

Table 28: The quota variables were gender, age and educational level.

We will integrate the specific sample characteristics in the specific research reports.

3.4. Interviewing the respondents

We had two options to collect the data: we could let the respondents fill out the questionnaires themselves (self-administered survey) or we could use interviewers to ask questions and note the answers. Since the first option requires the least resources in terms of money and time, we decided to let the respondents fill out their questionnaires themselves. Another argument for this option is the fact that some questions were relatively delicate and could induce feelings of social desirability and even influence the answers of the respondents if they would be posed by an interviewer (e.g. questions about xenophobia, political preference etc.). Previous research confirms the fact that self-administered surveys may produce less social desirability bias for some items (Hochstim, 1967). Another advantage is that, since the surveys were relatively extensive, the respondents could take their time to fill out the survey. Some possible disadvantages are: the self administered survey requires good reading and comprehension skills (especially when it concerns the longer and specific statements), we are never completely certain that the respondent has filled out his survey himself or that another relative has filled it out in his or her place. Notwithstanding these disadvantages, we decided distribute the questionnaires through our students, who had to take into account several selection criteria. One advantage is that the students could clarify questions to certain people (e.g. older people) or ask people to fill out parts and questions that they might have forgotten. The decision to let our students do the data collection was completely based on practical reasons: we did not have the financial resources nor did we obtain the permission of the qualified authorities to use the data from the register of population to perform a completely at random sampling procedure.

3.5. Structure of the research reports

The first three research reports will be constructed in a similar way as the primary objective of the six studies they cover are analogous as well. The first part exists of the validation of

the scales that were used and the descriptive statistics that will provide us with a general overview. Secondly, the cluster and discriminant analysis results will be presented in response to the second research objective: the segmentation of the information seekers. After having identified and profiled the categories of information seekers, we will give some more specific descriptive statistics that will show us how the attitudes and behaviour of opinion leaders versus non opinion leaders are, especially in the context of governmental communication efforts.

The last part of the research reports will include the general correlation tables that will provide us with the statistical building blocks for some linear relationships between the various concepts that are scrutinized. We will also try to confirm our structural equation models that try to draw the relation between the government as a risk regulator (protector) and as a risk communicator in the light of our third research objective.

RESEARCH REPORT I

TERRORISM

1. Introduction to the topic: terrorism as a socially and medially constructed risk

On 11th September 2001, two airplanes crashed into the Twin Towers in New York. About 3.000 people died in the terrorist attacks that day. The attacks on the 11th March 2004 in Madrid had increased the proximity of the threat for the Europeans. In total, 191 people got killed and approximately 1.800 people were injured. Some perceive this attack as the most deadly terrorist attack in Europe in modern times (Turegano-Fuentes, Perez-Diaz, Sanz-Sanchez, & Alonso, 2008)

Also the UK government perceives the preparedness of their citizens as a primary concern. The London bombings on 7th July 2005 have increased the communal sense of vulnerability (Page, Rubin, Amlot, Simpson, & Wessely, 2008). It was the first suicide terrorist attack by Islamic extremists in Great Britain. The attack had a death toll of 52 people and injured at least 700 commuters on the London public transportation.

Besides the directly involved victims, the ripple effects on the community as a whole are far-reaching and so these effects are also much scrutinized by scholars all over the world, from e.g. the general behaviour the public in terms of for instance avoiding public transportation (Handley, Salkovskis, & Ehlers, 2009) to the effects of the London attacks on the suicide figures in London and Wales (Salib & Cortina-Borja, 2009).

Rubin et al. have developed a measurement tool that scrutinizes several indicators of the population's overall psychosocial well-being. They are convinced that the overall political, medical, economical and psychological well-being can be determined and defined by means of some general indicators such as trust, perceived risk, sense of safety etc. (Rubin, Amlot, Page, & Wessely, 2008 p.S29). They also recognize the importance of this assessment to create efficient and accurate governmental and non-governmental communication programs.

2. Problem statement

As mentioned in the general problem statement, we have found little specific academic literature that provides the readers with concrete measurement tools to scrutinize the general risk perceptions and all related concepts as discussed above. As governments are facing the challenge to raise the feeling and the actual level of communal preparedness, without inducing a culture of fear, clear and well-considered communication strategies

should be constructed. In order to do so, they will need information about their communication target groups: perceptions, information needs, behaviour and behavioural intentions, general attitude towards the governments etc. The primary goal, besides assessing the general thoughts, feelings and attitudes, is to identify the key individuals that can play a crucial role in the success of their risk communication efforts and to construct the concrete profiles of this group so that all possible communication efforts would be effective and targeted. Since we will have to know the possible effects of the communication of risk information, it will also be crucial to identify the relationships between the processes and concepts that are involved in this complex process of risk communication. That is why multivariate data analysis can already unveil some important relationships between certain concepts. In this way, the effect (which is not always directly measurable and observable) can be predicted, even though it takes place on a rather abstract level. As we already indicated in the theoretical part, terrorism is a risk that is rather untransparent and that is mostly constructed socially and through the input of the media. The threat of a terrorist attack is unpredictable. On the other hand, it is of the upmost importance that the community is prepared, both on a tangible level (infrastructure, awareness of crisis plan instructions etc.) and especially on a psychological level. The question governments must ask themselves is: to what degree do our civilians really perceive the risk of terrorism as a personal threat and to what degree will risk communication programs about terrorism contribute to the raise of operational and communal psychological preparedness and resilience. That is why we need a clear view on the descriptive statistics of the key concepts that can allow us to take decisions and adjust the central objectives of potential risk communication strategies.

3. Objectives of the studies

As mentioned, the general objectives are threefold:

1. Construct and validate the methodology (measurement scales) that maps the key concepts of risk perception: the perceived risk of terrorism and the related concepts of mental distance, fear, protective behaviour, information seeking behaviour and social behaviour. A clear and comprehensive descriptive report on these concepts will be provided as well. This part of the report will include the general descriptive statistics as means and standard deviations and high and low percentages and will also report the statistically significant differences between gender categories and age groups.
2. Perform a segmentation study on the risk information seekers and identify and profile the opinion leaders by means of a newly composed clustering instrument.

Analyze and report the linear relationships between the risk perception and the related concepts in the context of terrorism and validate the SEM model that scrutinizes the relationship between risk regulation and communication.

4. Sampling procedure and descriptive statistics sample

The four samples for the four studies were convenience samples. The studies were conducted with the cooperation of the students that followed the course 'Mass Communication Research'. One part of their evaluation was related to the practical assignment of collecting and entering data into an SPSS datafile. First, they had to collect 6 or more surveys (depending on the size of the group and the required sample size), taking into account the primary selection variables: gender, age and educational level. After the data merge, the datasets were used to perform datacleaning and to learn them how to execute certain statistical tests. We guaranteed the respondents that their answers would be treated confidentially and that only the researchers that conduct the study would ever be able to associate individual respondents with their answers. In an accompanying letter, we guaranteed the anonymity of the respondents, however, we did ask for telephone numbers as we wanted to perform random cross checks to make sure that the students did not fill the surveys out themselves. Doubtful cases were deleted from the final files.

The following graphs provide us with the sample statistics (frequencies) of the age and gender criteria. Except for the slight overrepresentation of 45-54 years category in the Terrorism IV study (33%), we might state that the samples are rather equally distributed for age categories and equally distributed for gender.

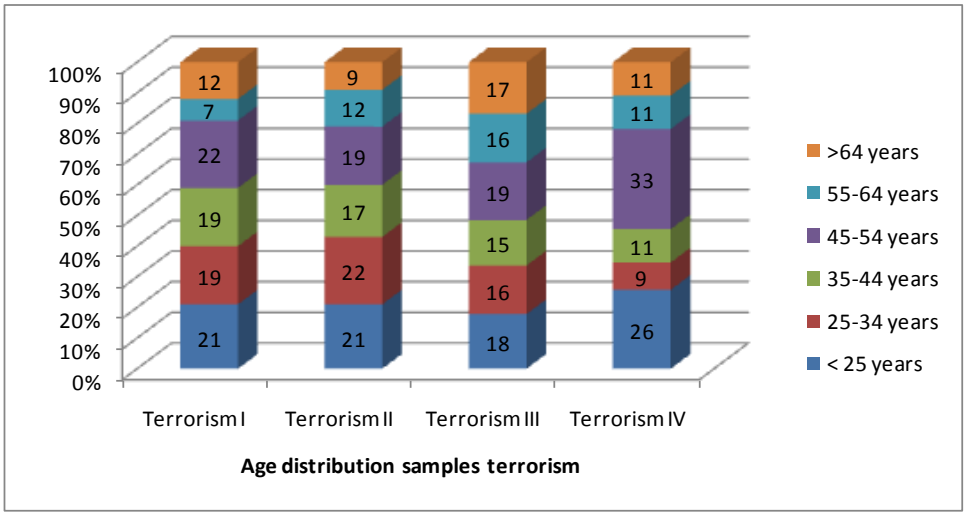


Figure 32: Age distribution samples terrorism

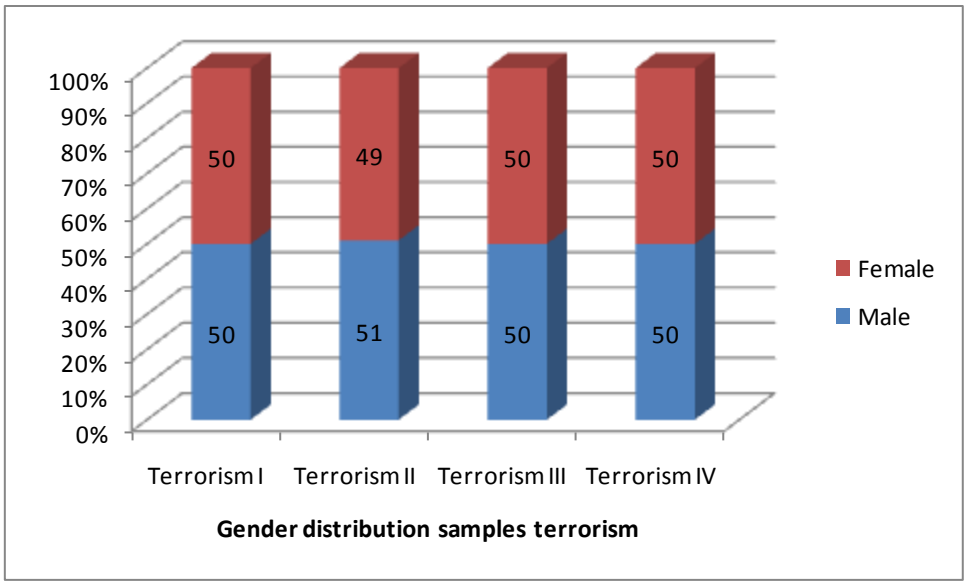


Figure 33: Gender distribution samples terrorism

We also compared our sample details to the population facts that are provided by the National Institute of Statistics (NIS) in Belgium. However, the available population statistics are not that detailed. We can only base ourselves for age groups on the facts of the age categories <20 years, 20-54 years and ≥65 years. We left the age group of <20 years out of the control check as we did not questioned minors.

We can see that the largest difference between the sample en the population is 7% (underrepresentation females >65 yrs in sample terrorism IV). We decided not to weigh this subsample as the differences are minimal.

Terrorism I				
Age category	**Male**		**Female**	
	Flanders	**Sample**	**Flanders**	**Sample**
20-64	**39%**	**44%**	**38%**	**43%**
≥65	**10%**	**5%**	**13%**	**8%**
$N_{Flanders}$ =6043161				
N_{sample} =1040				

Terrorism III				
Age category	**Male**		**Female**	
	Flanders	**Sample**	**Flanders**	**Sample**
20-64	**39%**	**42%**	**38%**	**39%**
≥65	**10%**	**8%**	**13%**	**10%**
$N_{Flanders}$ =6078600				
N_{sample} =851				

Terrorism IV				
Age category	**Male**		**Female**	
	Flanders	**Sample**	**Flanders**	**Sample**
20-64	**39%**	**45%**	**38%**	**44%**
≥65	**10%**	**5%**	**13%**	**6%**
$N_{Flanders}$ =6117440				
N_{sample} =1558				

Table 29: Comparisons sample and population percentages in the three large scaled quantitative survey studies

We did not include the table for the terrorism II sample as this sample only contains 160 respondents and we did not have the intention to draw descriptive and extrapolate the findings. The terrorism II research had as primary objective to validate the measurement scales and the segmentation of opinion leaders and to explore the correlations between the general concepts.

5. Validation of the general measurement scales

As mentioned previously in the operationalization paragraph, we decided to define the key concepts that can be located in the aura of risk perception, based on literature with a strong multidisciplinary nature (psychology, social psychology, communication sciences,…). We conducted an exploratory factor analysis (principal component analysis with Varimax rotation) on the items that were supposed to measure the key concepts. For the exploratory factor analysis, we used the Statistical Package for Social Sciences (SPSS) version 15.0.

In scale development processes, it is common that academics use split-half techniques to come to several independent samples to validate and compute the reliability of measurement scales (Hinkin, 1998; E. F. J. Ter Huurne, 2008). However, we will perform four quantitative survey studies to validate the methodology that integrates the central research objects in the context of risk perception and risk information seeking in the context of terrorism. So instead of splitting samples into half, we have four full samples that were used to validate the measurement scales.

The first table is the output of the PCA factor analysis that was conducted on the first exploratory quantitative study (Terrorism I, n=1040). It confirms the six dimensions that we had proposed and 60.43% of the variance is explained by these six underlying dimensions.

Construct/items	Factor loadings					
Total variance explained: 60.43%	**I**	**II**	**III**	**IV**	**V**	**VI**
Social Behaviour (talking to others)						
How often do you talk about terrorism to the following (groups of) persons: friends	0.81					
How often do you talk about terrorism to the following (groups of) persons: colleagues or fellow-students	0.76					
How often do you talk about terrorism to the following (groups of) persons: family s	0.70					
When there is a news items about terrorism, I will discuss it with other	0.70					
When there has been a TV-program about terrorism, it will be discussed in my personal environment	0.70					
I think it's important to have the possibility to talk to friends/family/colleagues… about terrorism	0.67					
Information seeking						
When there is an item about terrorism in the news, I will follow this item with more attention		0.87				
When there is a news item about terrorism, I will follow it with more attention		0.85				
When I'm reading a newspaper, I will never skip the articles or information about terrorism		0.70				
I explicitly look for information about terrorism in the media		0.51				
When I hear that there's news about terrorism, I will look for more information as quickly as possible		0.45				
Behaviour						
I have already thought about a plan to put me and my family in safety if a terrorist attack should take place			0.77			
I have tried to imagine how I would react in case a terrorist attack would take place in my personal environment			0.70			
Do you think about taking measures to prepare yourself for a possible terrorist attack			0.50			
Risk perception						
The presence of the European Commission in Belgium increases the risk of a potential terrorist attack in our country				0.72 *(0.70*)*		
Since the attacks in London, my fear for a possible attack in our country has increased				0.72 *(0.77*)*		
Since the attacks in London, I think there is a much bigger chance that there will be more attacks in Europe				0.69 (*0.76*)*		
I think there is a big chance that a terrorist attack will take place in Belgium				0.67 *(0.58*)*		
I think that the probability that an attack will occur in Belgium is high* *Item added in study III & IV*				*(0.66*)*		
Fear						
When I am in a public place, I sometimes realize that I am located at a potential target for a terrorist attack					0.83	

I always think twice before taking a plane nowadays	0.81
I am often looking for suspicious packages when I take the bus	0.80
Mental distance	
I do not worry about possible terrorist attacks because Bin Laden is far from here	0.83
I do not worry about terrorist attacks because they always take place far from here	0.75
Terrorist attacks only take place in countries where conflicts are fought out	0.70
Terrorism is something that happens in foreign countries	0.69
The wars in Afghanistan and Iraq do not have an influence on my way of living	0.69
Note: Extraction Method: Principal Component Analysis. Eigenvalues>1. Rotation Method: Varimax. Missing values: cases excluded listwise.	

Table 30: Factor analysis (PCA with Varimax rotation) for key constructs in context of terrorism

After the exploratory factor analyses, the scales have to be checked on internal consistency. As the items are all rated on Likert scales, it is possible to express the homogeneity of the (Likert)scale by means of the Cronbach's alpha measure. It is a measure that varies from 0 (low internal consistency or homogeneity of the scale) to 1 (perfect homogeneity). We have calculated all cronbach's alpha's by means of the reliability procedure in SPSS (15.0). The value has to exceed 0.65 (Frissen, Bouwman, & Den-Boer, 1994) and according to others 0.70 (Reynaldo, 1999). The item-total correlations have to exceed 0.30 to assure that the item correlates sufficiently with the total of the remaining items.

Construct	N	α study I n=1040	α study II n=160	α study III n=851	α study IV n=1558
Social Behaviour (talking to others)	**6**	0.85	0.85	0.88	0.83
Information seeking	**5**	0.79	0.79	0.82	0.82
Behaviour	**3**	0.61	0.66	0.61	0.64
Risk perception ** study III & IV N=5*	**4**	0.73	0.73	*0.81**	*0.83**
Fear	**3**	0.80	0.79	0.72	0.81
Mental distance	**5**	0.81	0.84	0.77	0.87

Table 31: cronbach's alpha values of the main constructs in the four studies

As we notice, the key constructs that are the backbone of this doctoral dissertation have stable cronbach's alpha's and can be labeled to be internally consistent. In all four studies in the context of terrorism, the values all exceeded 0.70 (threshold), except for the behaviour concept (alpha varies from 0.61 to 0.66), but all outputs showed that the item-total correlations for all items exceeded 0.30 and that the alpha if item deleted values never increased significantly when a particular item was deleted.
Besides the general concepts, some of the governmental communication related constructs have been constructed and validated. The subjoined tables provide us with an overview of the composition and internal consistencies of these constructs.

Construct	N	Items
Governmental preparedness	**8**	To what extent do you perceive the following governments as being prepared to terrorist attacks: national and local governments (2 items) To what extend do you think the following departments and services are prepared to terrorist attacks and their consequences: police, army, red cross, fire department, hospitals, civil services (6 items)
Quantity govinfo	**3**	The Belgian government provides us with a sufficient amount of information about terrorism The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of terrorism To what degree do you thing that the Belgian government offers a sufficient amount of information about terrorism?
General trust in government	**10**	Governmental preparedness (8 items) The government is making enough efforts to secure public places Governments take enough safety measures in order to keep terrorists away from nuclear plants

Table 32: Overview of the composition and internal consistencies of the government communication related concepts

Construct	N	α study I n=1040	α study II n=160	α study III n=851	α study IV n=1558
Governmental preparedness	**8**	0.85	0.89	0.85	0.87
Quantity govinfo *in study I & II only 1 item	**3**	-*	-*	0.77	0.73
General trust in government	**10**	0.84	0.89	0.85	0.85

Table 33: Cronbach's alpha values of the governmental related constructs in the studies

The high alpha values proof the good internal consistency of the constructed scales in the four quantitative studies.
After having validated the measurement scales, we will now provide an extensive and comprehensive overview of the descriptive statistics of the key constructs.

6. Comprehensive descriptive report

The first block of tables provides us with a descriptive overview of the general concepts that form the backbone of the studies. The tables only include statistically significant results. We decided to include both the means as indicators of centrality (with associated standard deviations) as the percentages of people who have low (score of 1 and 2 on 6 point scales) and high scores (score of 5 and 6 on 6 point scale). The latter can also inform us about the degree in which people have a true opinion about a statement, as we have an idea about the percentage of people who have answered neutrally. Sometimes people do not have a pronounced opinion about certain issues, and this is important to be reflected in the tables.
The constructs consist of items that were measured on six point Likert scales (1 standing for totally do not agree and 6 standing for totally agree), so the means have to be interpreted as a figure between 1 and 6. We also performed anova analyses to test the significance of the differences in means between the four samples. We find some statistically significant differences between the means. However, we have to interpret this with care as the samples had slightly different proportions for age, educational and gender. The samples were not attuned to one reference sample by means of a weighing procedure.

Construct	Mean	St.Dev.	Difference	% Low	% High
Risk perception					
Terrorism I	3.59*	0.75	F(2,3406)=44.93	16	5
Terrorism III	3.79*	0.83	p=0.000	13	10
Terrorism IV	3.47*	0.80		21	5
Mental distance					
Terrorism I	2.50*	0.84	F(2,3404)=14.42	71	1.3
Terrorism III	2.71*	0.89	p=0.000	59	1.3
Terrorism IV	2.61*	0.90		63	1.9
Fear					
Terrorism I	2.50	1.04	n.s.	63	2.7
Terrorism III	2.53	0.99		61	1.4
Terrorism IV	2.56*	1.01		60	2
Behaviour					
Terrorism I	2.19*	0.83	F(2,3241)=48.65	79	0.5
Terrorism III	2.25*	0.83	p=0.000	75	0.5
Terrorism IV	2.51*	0.88		66	0.7
Information seeking					
Terrorism I	3.43	0.89	F(2,3413)=62.41	26	5
Terrorism III	3.41	0.94	p=0.000	26	6
Terrorism IV	3.77*	0.92		26	5
Talking to others					
Terrorism I	3.34*	0.82	F(2,3315)=44.87	27	3
Terrorism III	3.10*	0.89	p=0.000	39	2
Terrorism IV	3.44*	0.81		26	2
Significance key	* differ significantly from other years min. at 0.05 level				

Table 34: Descriptive statistics of key concepts in the context of terrorism

The mean risk perception levels are for all three studies above average (3.6 to 3.8) and the mean mental distance is rather low (2.5 to 2.7). However, when we look at the exact percentage of people indicating a high risk (% equal or above 5 on 6 point scale), there is only a small percentage of people that actually think that an attack will occur in Belgium. On the contrary, 59% to 71% of the people (over the three studies) perceive the terrorist threat as a rather proximate risk. The fear levels however are rather low: the mean fear level is 2.5 and approximately 60% of the respondents indicated that they are not affected by feelings of fear in their daily life (avoiding public places, taking public transportation). The low behavioural intentions in terms of taking protective measures are very low as well (mean = 2.2 to 2.5 and only 0.5% has a high score on the behaviour construct). In terms of their social and information seeking behaviour, there is only a small part of the respondents who have high rates on these constructs (respectively 2% and 5%) but the means are above average (social = 3.4 to 3.7 and information seeking 3.1 to 3.4). All of these figures indicate that, even though the majority of the respondents perceive the terrorist threat as a risk that is very near (mental distance), the actual percentage of people who have a high probability level, who are affected in their fear levels and behavioural intentions, who talk a lot to others about the topic and who indicate that they look for information about terrorism is low. A lot of people answer quite neutrally (3 and 4 on 6 point scales), which indicates that the majority does not really have an outspoken opinion, probably because the risk is not transparent and especially because the Belgian population have not (yet) been confronted with terror attacks. We would also like to refer to Lemyre et al., who also scrutinized the perceptions of terrorism and the related concepts in Canada (Lemyre, Turner, Lee, & Krewski, 2006). We could make prudent comparisons between the results of Lemyre et al. in Canada and our results in Belgium as there have not been any terrorist attacks on both Canadian as Belgian soil in recent years. So the Canadian and Belgian contexts can be expected to distinguish themselves from those in the U.S. or U.K. According to Lemyre et al., ony 13.3% of the respondents in their stufy indicated that terrorism posed a high risk to the Canadian public. Naturally there are some important restrictions to this comparison between our findings and Lemyre's. First of all, the methodologies are similar (surveys using five point scales measuring the key concepts) but we used questionnaires and Lemyre et al. questioned their respondents by telephone.Secondly, the questions were similar as well, but we have to consider that slight differences in the formulation of the statements may lead to differences in the answers as well. Thirdly, cultural differences between both populations may play an important role in the differences of risk perception. Despite of these limitations for the comparison, there are still some remarkable similarities.

6.1. Gender differences

Construct	Terrorism I	Terrorism III	Terrorism IV
Risk perception			
Male	n.s.	**3.70**	**3.41**
Female		**3.87**	**3.52**
t value		t(837)=-2.98**	t(1538)=-2.74**
Mental distance	n.s.	n.s.	n.s.
Fear			
Male	**2.38**	**2.41**	**2.49**
Female	**2.61**	**2.65**	**2.63**
t value	t(1014)=-3.71***	t(844)=-3.48***	t(1544)=-2.66**
Behaviour	n.s.	n.s.	n.s.
Information seeking	n.s.	n.s.	n.s.
Talking to others	n.s.	n.s.	n.s.
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001		

Table 35: Gender differences for key constructs

Gender differences can only be statistically confirmed for risk perception and fear: women have slightly higher means for both constructs. Similar results were retrieved by Lemyre et a. in their survey study about the risk perception of terrorism in Canada (Lemyre et al., 2006). Lemyre et al. also confirmed that women have significantly higher risk perception scores than men for the perceived risk of terrorism.

6.2. Differences for age groups

Concerning differences between age categories, we have found more significantly different results:

Construct	Terrorism I	Terrorism III	Terrorism IV
Risk perception			
<25 years	3.42	3.59	3.28
25-44 years	3.59	3.76	3.46
45-64 years	3.65	3.87	3.56
>64 years	3.76	3.79	3.55
	F(3,1021)=6.41***	F(3,830)=5.35***	F(3,1531)=10.74***
Mental distance			
<25 years	2.54	2.62	2.73
25-44 years	2.40	2.59	2.64
45-64 years	2.43	2.67	2.51
>64 years	2.93	3.14	2.71
	F(3,1012)=14.16***	F(3,836)=13.73***	F(3,1528)=5.94***
Fear			
<25 years	2.17	2.04	2.16
25-44 years	2.45	2.53	2.55
45-64 years	2.67	2.71	2.71

>64 years	2.78	2.70	2.95
	F(3,1015)=13.86***	F(3,837)=17.96***	F(3,1537)=36.89***
Behaviour			
<25 years	2.36	n.s.	2.40
25-44 years	2.19		2.53
45-64 years	2.14		2.53
>64 years	1.99		2.71
	F(3,1021)=5.51***		F(3,1363)=4.38**
Information seeking			
<25 years	3.26	3.11	3.55
25-44 years	3.39	3.34	3.71
45-64 years	3.47	3.58	3.86
>64 years	3.76	3.42	4.04
	F(3,1020)=8.78***	F(3,836)=9.63***	F(3,1529)=15.43***
Talking to others			
<25 years	3.53	3.24	3.50
25-44 years	3.40	3.19	3.43
45-64 years	3.26	3.11	3.47
>64 years	2.88	2.65	3.18
	F(3,978)=17.23***	F(3,793)=12.03***	F(3,1516)=6.01***
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001		

Table 36: Age differences for key constructs

For risk perception, respondents younger than 25 years old have the lowest means. Older people tend to have higher risk perceptions (>45years old). Lemyre et al. found similar results for the risk perception across the various age categories in their study (2006 p. 761). Contradictory, the mental distances of the >64 year olds are the highest, indicating that they perceive the risk of terrorism as something that is not very proximate. The respondents who are older than 45 years also have somewhat higher fear levels but the values do not exceed 3, it is remarkable however that the youngest group has the lowest fear levels. For behaviour we find significant differences, but they are not consistent for the two studies. Concerning risk information seeking, the youngest age category has the lowest mean, opposite to the social behaviour where the youngest respondents (<24) have the highest mean and the oldest group the lowest.

6.3. Information seeking behaviour

In this paragraph, we will take a closer look at the specific information seeking behaviour. As mentioned previously, we split up the information seeking behaviour into three types, according to the intensity of seeking: active information seeking, event triggered information seeking (active seeking behaviour in the aftermath of a terrorist attack) and passive information scanning.

Construct	Mean	St.Dev.	Difference	% Low	% High
Active info seeking					
Terrorism I	2.33	1.06	F(2,3436)=57.52	59	4
Terrorism III	2.37	1.08	p=0.000	57	4
Terrorism IV	2.75*	1.13		59	8
Event triggered info seeking					
Terrorism I	3.16	1.34	F(3433)=27.60	33	16
Terrorism III	3.16	1.33	p=0.000	33	16
Terrorism IV	3.50*	1.35		37	26
Passive info scanning					
Terrorism I	3.88	1.04	F(2,3428)=45.69	19	19
Terrorism III	3.85	1.07	p=0.000	19	19
Terrorism IV	4.20*	1.02		16	16
Significance key	* differ significantly from other years min. at 0.05 level				

Table 37: Information seeking in the context of terrorism

To summarize, only 4% to 8% of the respondents actively seek for risk information in the context of terrorism (means also lower than 3). The percentage for event trigger information search is higher (16% to 26%) and the means range from 3.16. to 3.5. The percentage of people that passively scan information is not much higher (16% to 19%) but the means vary from 3.9 to 4.2, which is higher than with event triggered information search. So the pyramidal structure for information seeking categories, ranging from intensive information seeking to passive information scanning is empirically confirmed. In the fourth study, we also integrated the perceptions about specific types of risk information.

6.4. Information nature (Terrorism IV only)

The subjoined table integrates the frequency of seeking specific types of information, the mean score of importance of that type of information (score on 10) and the % of respondents who attributed a score equal or higher than 7.

Risk info nature	How often do you look for the following type of information		Mean score/10	St.Dev.	% score ≥7/10
	% rarely/never	% often/always			
Info about the probability that a terrorist attack will take place in Belgium	53	7	5.6	2.7	43
General information about terrorism	44	5	5.5	2.5	41
Specific info about recent terrorist attacks	23	13	6.4	2.4	56
Info about the controllability of the risk	64	5	5.1	2.7	33
Info about exposure to the risk	57	5	5.0	2.6	32
Info about the consequences of an attack	50	6	5.5	2.5	40
Guidelines about what to do during a terrorist attack	66	5	5.4	2.9	42
Info about who's responsible	48	6	5.2	2.6	35
Experiences of other people with the risk	71	2	4.3	2.4	21
Info about similarity with other risks	68	3	4.2	2.5	20

Table 38: Descriptive statistics for information nature

The information that is searched for most often is specific information about recent terrorist attacks (13%), however, the general percentages (of people that often or always look for) for all categories are very low (ranging from 2% to 7%). This is an extra confirmation of the fact that the active seeking behaviour is very low. The mean scores are all located around 5 on the 10 point scale. However, we notice that the % of people who perceive that the specific information is important (score >7/10) varies from 20% to 56%, which indicates that people are convinced that risk information is important. The most successful are specific information about recent attacks (56%), probability information (43%), guidelines about what to do in case an attack occurs (42%) and general information about terrorism (41%). The least important information is information about experiences of other people with the risk (21%) and info about the similarity of the risk with other risks (20%).
In this first part, we have tried to briefly summarize the general descriptive statistics of the central constructs that surround risk perception. We have ascertained that there are some general gender and age differences and that the general figures of risk perception, fear, social behaviour and information seeking are rather low. As we strongly assumed that the 'public' is not a homogeneous group of receivers, basing ourselves on the traditional personal influence and social behaviours theories, we have attempted to explore possible segmentations of information seekers. In the next part, we will try to identify and profile the potential groups of information seekers by means of a basic cluster analysis.

7. Identifying and profiling the public

7.1. Identification of opinion leaders

From the literature on opinion leadership, discussed in chapter four (3.7) and the link with information seeking behaviour in risk contexts, we decided to identify opinion leaders by means of three mains traits:

1 **Information seeking behaviour**, split up in active information seeking, event-triggered information seeking and passive information scanning.
2 **Social behaviour**, expressed in the frequency of talking to others about the involved risk context
3 **Specific opinion leadership traits: influence**. In these first surveys that we conducted, this trait was measured by means of one specific item
"In conversations, my friends, colleagues, family… attach much importance to my opinion concerning the financial economical crisis."

We opted to perform K – means cluster analyses to reveal groups and we performed discriminant analyses to further investigate the retrieved clusters.

7.2. Cluster analysis

Cluster analysis actually consists of a group of techniques (k-means, hierarchical, two step) whose purpose is to group objects (respondents) based on the characteristics they possess. Taking into account several predetermined selection variables, the analysis tries to classify cases into groups that exhibit high internal homogeneity (within clusters) and high external homogeneity (between clusters) (Hair, Anderson, Tatham, & Black, 1998). We used cluster analysis to explore and form a taxonomy or an empirically based classification of our respondents based on their risk information seeking and social behaviour. We decided to use the k-means cluster analysis technique because we have predefined the clustering variables. Missing data were deleted casewise. As mentioned by Hair et al. (1998), there is no standard and objective selection procedure to determine the number of clusters. We decided to perform the analysis for two, three, four and five clusters as our aim is to define target groups for risk communication efforts, and more than five target groups are not manageable. The two and three group solutions were good but not specific enough, the five group solution was too complex and did not lend itself to be interpreted in a meaningful way. Moreover, the two, three and five group solutions were not similar at all in the three studies (and neither in the studies about the bird flu and financial economical crisis). The four group solution was a perfectly explicable and stable solution that was retrieved in all four terrorism studies and also in the bird flu and financial economical crisis study.
First, we will graphically describe the four clusters that were retrieved in the four studies.

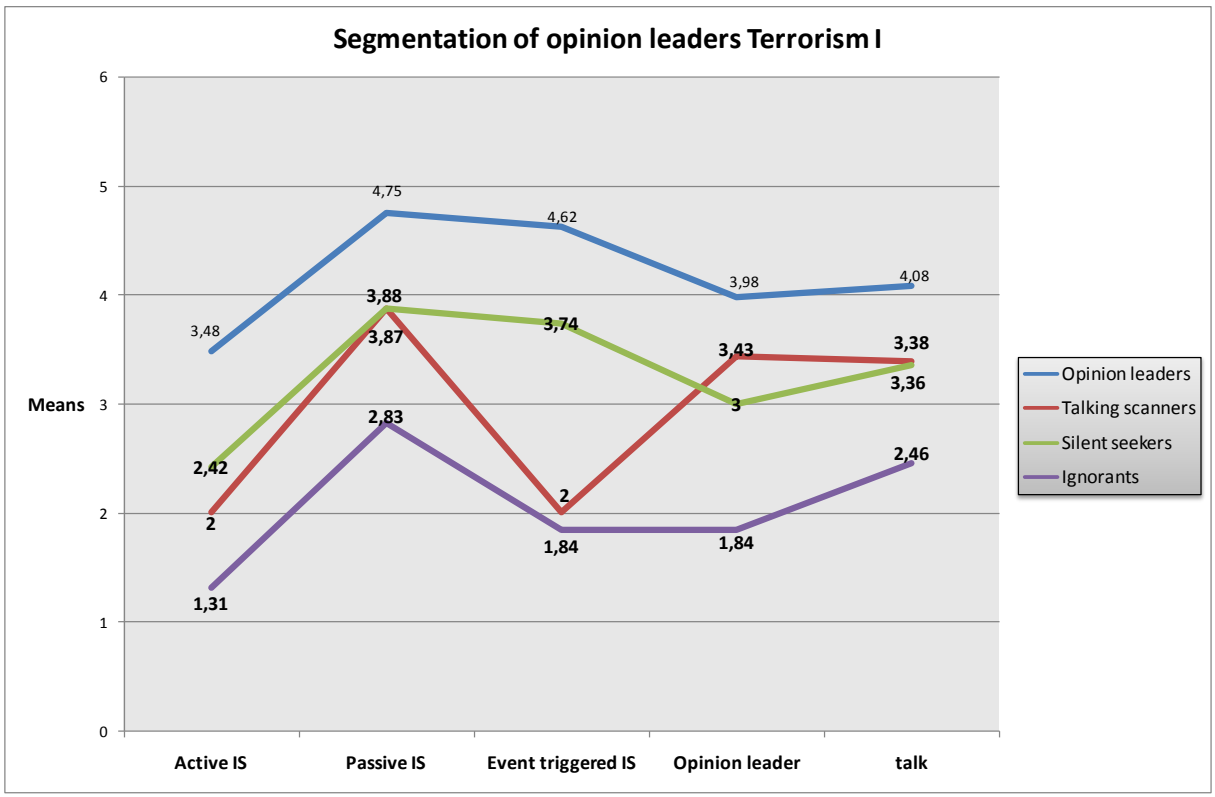


Figure 34: Segmentation of opinion leaders of sample I (K-means clustering)

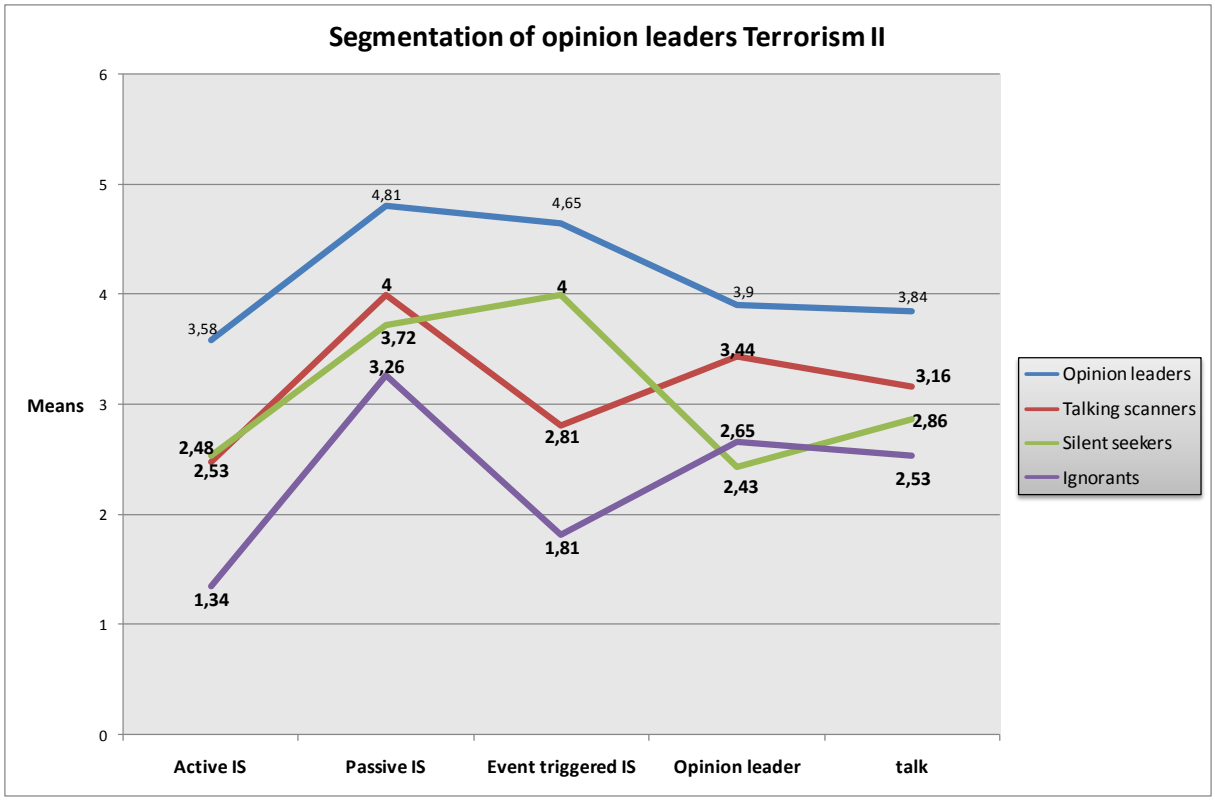


Figure 35: Segmentation of opinion leaders of sample II (K-means clustering)

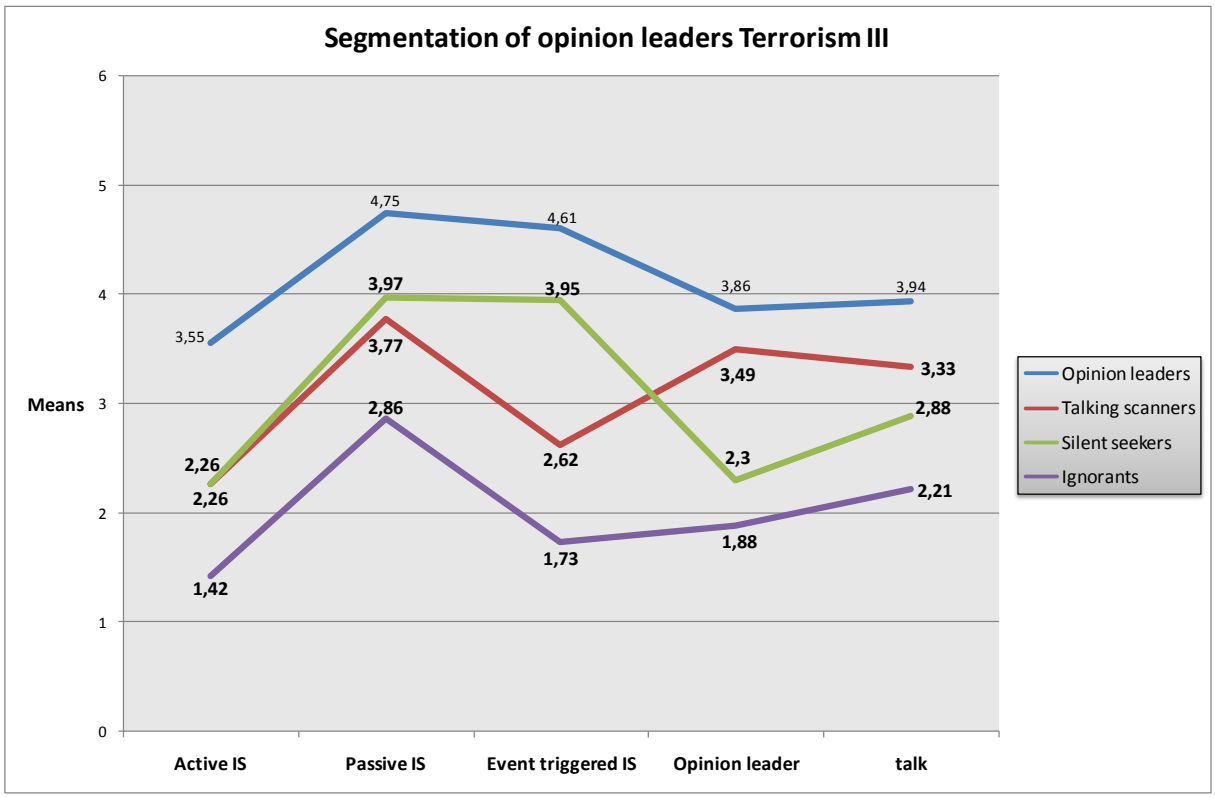


Figure 36: Segmentation of opinion leaders of sample III (K-means clustering)

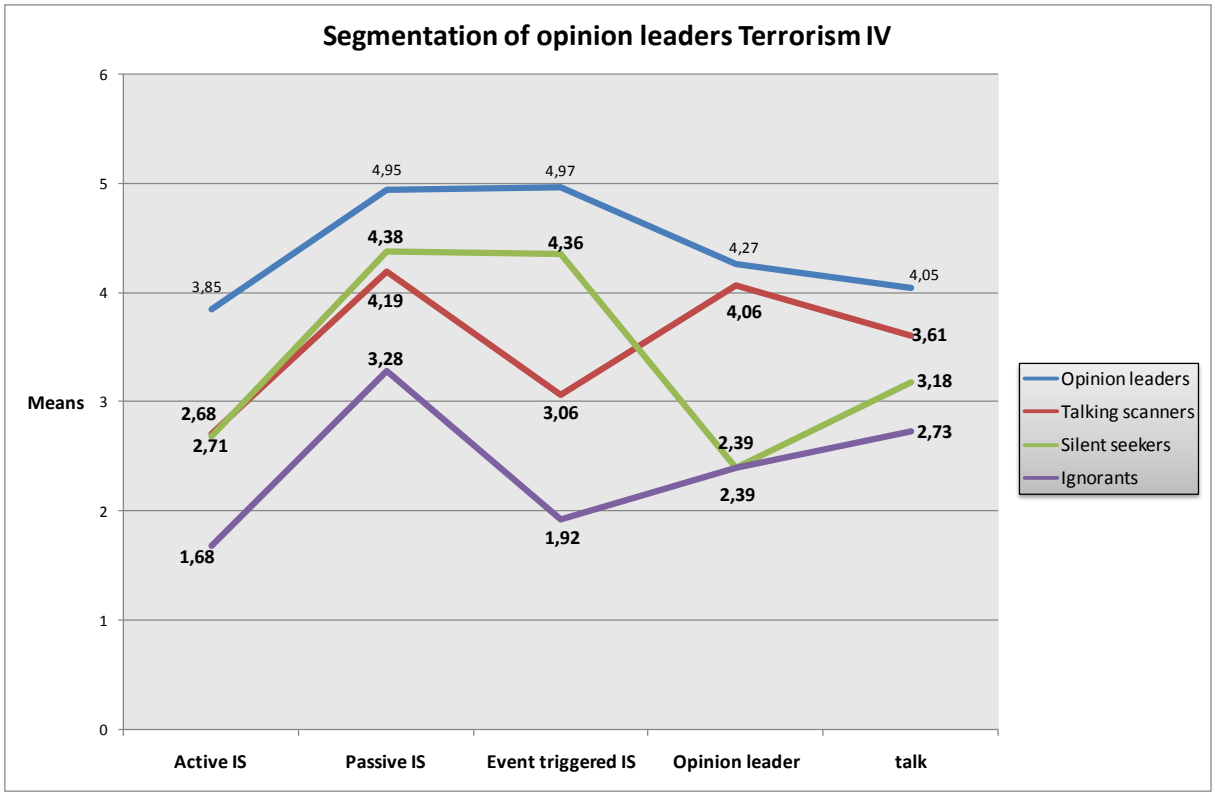


Figure 37: Segmentation of opinion leaders of sample IV (K-means clustering)

The subjoined table depicts the presence of each cluster in the samples, expressed in percentages.

Cluster	% Terrorism I N=1040	% Terrorism II N=160	% Terrorism III N=851	%Terrorism IV N=1558
Opinion leaders	21	21	21	25
Talking scanners	24	33	34	34
Silent seekers	37	20	22	18
Ignorants	19	26	23	23

Table 39: Overview of the presence of each cluster of information seekers in the samples

We have consistently retrieved and defined the following four groups:

1. **Opinion leaders.** This is the group of respondents that has the highest scores on all cluster variables. Their information seeking behaviour is high (active, passive and event triggered search), they consider themselves as opinion leaders and they talk more about terrorism to other people than the other groups. This is the most important group of people as it will also be our primary target group in our risk communication programs since the diffused information will reach them more accurately and they will talk to other people about the risk of terrorism. The percentage of opinion leaders varies from 21% (in three studies) to 25%, so this

percentage is quite stable. This figure also corresponds with the percentage of opinion leaders that had been found in previous studies in various contexts: 21% in the ECS study and 22% in the Elmira study and 1 opinion leader for 3 or 4 persons (so 25 to 33%) in the field of political communication (Boone, 1971).

2. The second group is the group of **silent seekers.** Their active information seeking behaviour is low, but their passive and especially their event triggered information search behaviour is rather high. However, they only score averagely on social behaviour and they even score rather low on the opinion leadership (perceived influence) trait. The percentage varies from 18% to 37%, so it is quite variable. This group does not play a very important role as a target group for communication efforts as they will not spread the information that they retrieve. Their active information seeking behaviour is not high either so they will not come to the information that would be deliberately spread by the governmental institutions.
3. The third group is the group of **talking scanners.** This group is characterized by its rather high passive information search behaviour, but a low active and moderate event triggered information search. On the contrary, they have high scores on social behaviour and opinion leadership in terms of perceived influence. The percentage varies from 24% to 34% so it is not as stable as the opinion leaders but not as variable as the silent seekers. This group may be of importance to risk communicators as they do talk about terrorism and they perceive themselves as opinion leaders, but they do not look for specific (and correct) information actively. It may be important to discover their media profiles so that they could be reached effectively if very crucial information would have to be disseminated in the community (e.g. guidelines). This group could be a secondary target group in the risk communication strategy.
4. The last group is the group of **ignorants**. These people generally score low on all variables. They are not interested in terrorism, they do not talk about it and do not consider themselves as opinion leaders. They are no primary and even no secondary target group as they do not look for or retrieve information about terrorism neither do they talk about the subject. Their percentages vary from 19% to 26%.

7.3. Additional analyses

The **analysis of variance** is used to compare the means for each of the five dimensions between the four groups (taking into account the between and within group variance). We see that the means of the specific clustering variables differ significantly from each other for all four groups in all four studies.

Variable	Analysis of Variance (risk I to merge)					
	Between SS	df	Within SS	df	F	signif. p
active IS	482,973	3	605,0107	965	256,7826	0,00
event triggered IS	1184,469	3	571,4273	965	666,7591	0,00
opinion leader	470,537	3	575,0065	965	263,2252	0,00
talk	250,857	3	394,1367	965	204,7318	0,00
passive IS	350,666	3	711,6811	965	158,4944	0,00

Variable	Analysis of Variance Terrorism II					
	Between SS	df	Within SS	df	F	signif. p
active IS	86,4531	3	81,54685	143	50,5346	0,000000
event triggered IS	165,5802	3	57,08647	143	138,2579	0,000000
opinion leader	46,1027	3	80,44147	143	27,3188	0,000000
passive IS	42,3430	3	98,88306	143	20,4115	0,000000
talk	31,3335	3	62,63131	143	23,8469	0,000000

Variable	Analysis of Variance Terrorism III					
	Between SS	df	Within SS	df	F	signif. p
active IS	403,7968	3	496,5916	789	213,8549	0,00
event triggered IS	913,1453	3	463,7349	789	517,8760	0,00
opinion leader	499,0317	3	421,1827	789	311,6115	0,00
talk	286,2475	3	333,9888	789	225,4060	0,00
passive IS	317,1407	3	566,4236	789	147,2537	0,00

Variable	Analysis of Variance Terrorism IV					
	Between SS	df	Within SS	df	F	signif. p
talk	346,347	3	643,962	1496	268,202	0,00
event triggered IS	1970,776	3	761,015	1496	1291,381	0,00
active IS	848,144	3	1060,244	1496	398,909	0,00
opinion leader	1121,349	3	959,096	1496	583,028	0,00
passive IS	513,658	3	1047,781	1496	244,464	0,00

Table 40: Analyses of variance for four samples of terrorism

Other useful results to examine are the **Euclidean distances (E.D.)** and squared Euclidean distances (E.D.²) between clusters These distances (Euclidean and squared Euclidean) are computed from the cluster means on each dimension.

Cluster Number	Euclidean Distances between Clusters Terrorism I Distances below diagonal Squared distances above diagonal			
	No. 1	No. 2	No. 3	No. 4
No. 1	0,000000	2,151813	0,821821	4,658165
No. 2	1,466906	0,000000	0,698345	0,988483
No. 3	0,906543	0,835670	0,000000	1,623097
No. 4	2,158278	0,994225	1,274008	0,000000

Cluster Number	Euclidean Distances between ClustersTerrorism II Distances below diagonal Squared distances above diagonal No. 1	No. 2	No. 3	No. 4
No. 1	0,000000	0,771554	0,535609	1,176114
No. 2	0,878381	0,000000	1,341373	3,734798
No. 3	0,731853	1,158176	0,000000	1,154714
No. 4	1,084488	1,932562	1,074576	0,000000

Cluster Number	Euclidean Distances between Clusters Terrorism III Distances below diagonal Squared distances above diagonal No. 1	No. 2	No. 3	No. 4
No. 1	0,000000	1,415359	1,228835	0,686088
No. 2	1,189689	0,000000	4,647094	1,251235
No. 3	1,108528	2,155712	0,000000	1,495073
No. 4	0,828304	1,118586	1,222732	0,000000

Cluster Number	Euclidean Distances between Clusters Terrorism IV Distances below diagonal Squared distances above diagonal No. 1	No. 2	No. 3	No. 4
No. 1	0,000000	0,933214	1,153649	1,343406
No. 2	0,966030	0,000000	1,266352	1,670167
No. 3	1,074081	1,125323	0,000000	4,410228
No. 4	1,159054	1,292349	2,100054	0,000000

Table 41: Euclidean distances between clusters for four samples of terrorism

The table shows that the opinion leaders are closer to the talking scanners, but still the distances versus the other groups are quite high. Silent seekers and talking scanners are closest to each other, they differ significantly but not as much as from the other clusters. The next step for validating our four clusters is the performance of a discriminant analysis.

7.4. Discriminant analysis

By means of the discriminant analysis, we will cross-check and further analyze our segmentation. Hair et al. determined four main purposes of discriminant analysis (Hair et al., 1998):

1. To determine whether the differences between the average score profiles of two or more groups (in our case 4 groups of information seekers) on a set of variables (here 5 variables) are statistically significant.
2. To determine which one of the 5 independent variables in the analysis account the most for the differences in the average score profiles of the four groups
3. To construct classification functions that can classify the respondents into the correct group on the basis of their scores on the 5 determining independent variables.

4. To establish the number and composition of the discriminating dimensions between the four groups from the set of independent variables.

7.4.1. Assessing the overall fit of the proposed model

The Wilks' Lambda, Hotellings's trace and Pillai's parameters all evaluate the statistical significance of the discriminatory power of the discriminant functions As we use Statistica 7 software program to perform the discriminant analyses, the Wilks' Lambda is calculated and interpreted. Wilks' Lambda is calculated by dividing the determinant of the within the between-groups multivariate dispersion matrix IWI through the determinant of the sum of the within- and between groups IAI multivariate dispersion matrix: Wilks' Lambda = IWI / IW+AI. So the larger the between-groups dispersion, the smaller the value of Wilks' Lambda and the greater the implied significance (Hair et al., 1998). Wilks' Lambda can assume values in the range of 0 (perfect discrimination) to 1 (no discrimination).

Wilks' Lambda is varies from **0.10** (study II and IV) to **0.11** (study I and II) with significant F values ($p<0.000$), so the low Wilks' Lambda proves that the between-groups dispersion is large compared to the within groups dispersion. The four groups differ significantly and the five independent variables are discriminant items.

The **Wilks' Lambda's** which are mentioned in the first column of the output, refer to the Wilks' Lambda for the overall model that will result after removing the respective variable from the model. None of the Wilks' lambda's exceed 0.246 (infoaans). So each one of the independent variables contribute to the discrimination. The **Partial Lambda's** in the second column are associated with the unique contribution of the respective variable to the discriminatory power of the model. The value (that ranges from 0 to1) has to be as low as possible. We can read that the partial lambda's range from 0.447 to 0.956.

The **F-remove** values are associated with the respective partial Wilk's Lambda's and the **p-levels** indicate the significance levels of the F values. All F values are significant, except for the talk variable in the second study, even though the other parameters are good. The higher p level is probably due to the small sample of 160 respondents.

The **Tolerance** values are in fact the results of $1-r^2$ of the respective variable with all other variables in the model as shown in the output. It is a measure of the redundancy of the respective variable. Naturally, 1-Tolerance is the r^2 of the respective variable with all other variables in the model/output. The miminum r^2 (0.04) is the one of the variable **infoaans**. Its Tolerance value is 0.96, which means that the variable **talk** is 4% redundant with the other variables. The highest r^2 is 0.14 (Tolerance=0.86), which means that 14% of the variable **opionlea** is explained by the other five variables in the model.

N=969	Discriminant Function Analysis Summary Terrorism I No. of vars in model: 5; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,11027 approx. F (15,2653)=216,27 p<0,0000					
	Wilks' Lambda	Partial Lambda	F-remove (3,961)	p-level	Toler.	1-Toler. (R-Sqr.)
active is	0,143947	0,766013	97,8495	0,000000	0,955497	0,044503
event triggered is	0,246580	0,447179	396,0093	0,000000	0,959279	0,040721
opinion leader	0,152676	0,722217	123,2086	0,000000	0,862241	0,137759
talk	0,115278	0,956521	14,5608	0,000000	0,917134	0,082866
passive is	0,131527	0,838349	61,7671	0,000000	0,916899	0,083101

N=147	Discriminant Function Analysis Summary Terrorism II No. of vars in model: 5; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,10594 approx. F (15,384)=32,141 p<0,0000					
	Wilks' Lambda	Partial Lambda	F-remove (3,139)	p-level	Toler.	1-Toler. (R-Sqr.)
active is	0,131174	0,807621	11,03682	0,000002	0,890089	0,109911
event triggered is	0,228842	0,462933	53,75321	0,000000	0,921216	0,078784
opinion leader	0,144494	0,733168	16,86271	0,000000	0,850293	0,149707
passive is	0,125032	0,847290	8,35084	0,000038	0,951985	0,048015
talk	0,110699	0,956997	2,08202	0,105379	0,887901	0,112099

N=793	Discriminant Function Analysis Summary Terrorism III No. of vars in model: 5; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,11225 approx. F (15,2167)=174,60 p<0,0000					
	Wilks' Lambda	Partial Lambda	F-remove (3,785)	p-level	Toler.	1-Toler. (R-Sqr.)
active is	0,131143	0,855954	44,0352	0,000000	0,960620	0,039380
event triggered is	0,213301	0,526262	235,5510	0,000000	0,971411	0,028589
opinion leader	0,167339	0,670808	128,4105	0,000000	0,915629	0,084371
talk	0,120496	0,931589	19,2153	0,000000	0,915691	0,084309
passive is	0,124061	0,904818	27,5260	0,000000	0,961762	0,038238

N=1500	Discriminant Function Analysis Summary Terrorism IV No. of vars in model: 5; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,10047 approx. F (15,4119)=356,67 p<0,0000					
	Wilks' Lambda	Partial Lambda	F-remove 3,1492	p-level	Toler.	1-Toler. (R-Sqr.)
talk	0,103580	0,969972	15,3964	0,000000	0,901577	0,098423
event triggered is	0,211929	0,474072	551,7343	0,000000	0,969032	0,030968
active is	0,119433	0,841224	93,8687	0,000000	0,947736	0,052264
opinion leader	0,169575	0,592479	342,0776	0,000000	0,886213	0,113787
passive is	0,107029	0,938714	32,4697	0,000000	0,961388	0,038612

Table 42: Lambda values in the four samples of terrorism

The variable 'Event triggered information seeking' contributes most to the overall discrimination in all four studies (lambda if variable removed ranges from 0.21 to 0.25 and partial lambda ranges from 0.45 to 0.53). The variable that contributes least is the social behaviour (talk) (lambda if variable removed ranges from 0.11 to 0.12 and partial lambda ranges from 0.93 to 0.97). For all four studies, the converted F values of all variables in the model are statistically significant on the 0.0001 level, except for the social behaviour variable (talk) in study II (F=2.08, p=0.10), probably because of the small sample size (n=160). So the

most discriminating variable is the event triggered information seeking variable, followed by the opinion leadership variable, the active and passive information seeking variables and eventually social behaviour (talk) as the least important discriminator.

7.4.2. Assessing groups membership prediction accuracy

The **classification matrix** contains information about the number and percent of correctly classified cases in each group. The subjoined classification matrix shows us that the percentage of cases that are correctly assigned to the predicted groups varies from 94% (study I) to 97% (study II and III). For the most important group in our research, the opinion leaders, this percentage varies from 86% to 97%. These hit ratios are high and so we can state that the model with 5 variables is a good predictive model that is stable as well as both the hit ratios as the Lambda's are stable across the four studies.

	Classification Matrix Terrorism I Rows: Observed classifications Columns: Predicted classifications				
Group	Percent Correct	Opinion leaders p=,20640	Talking scanners p=,23529	Silent seekers p=,37049	Ignorants p=,18782
Opinion leaders	86,00000	172	0	28	0
Talking scanners	93,42105	0	213	15	0
Silent seekers	99,72145	0	1	358	0
Ignorants	93,95605	0	7	4	171
Total	94,32404	172	221	405	171

	Classification Matrix Terrorism II Rows: Observed classifications Columns: Predicted classifications				
Group	Percent Correct	Talking scanners p=,32653	Ignorants p=,25850	Silent seekers p=,20408	Opinion leaders p=,21088
Talking scanners	100,0000	48	0	0	0
Ignorants	97,3684	1	37	0	0
Silent seekers	93,3333	2	0	28	0
Opinion leaders	96,7742	0	0	1	30
Total	97,2789	51	37	29	30

	Classification Matrix Terrorism III Rows: Observed classifications Columns: Predicted classifications				
Group	Percent Correct	Talking scanners p=,34048	Opinion leaders p=,21438	Ignorants p=,22951	Silent seekers p=,21564
Talking scanners	100,0000	270	0	0	0
Opinion leaders	96,4706	2	164	0	4
Ignorants	92,8571	11	0	169	2
Silent seekers	97,0760	2	2	1	166
Total	96,9735	285	166	170	172

Group	Classification Matrix Terrorism IV Rows: Observed classifications Columns: Predicted classifications Percent Correct	Talking scanners p=,34400	Silent seekers p=,17533	Opinion leaders p=,24733	Ignorants p=,23333
Talking scanners	97,09303	501	0	8	7
Silent seekers	95,05704	5	250	6	2
Opinion leaders	94,87871	19	0	352	0
Ignorants	93,71429	19	3	0	328
Total	95,40000	544	253	366	337

Table 43: Classification matrices in the four studies of terrorism

7.5. Profiling opinion leaders

It is clear that the most important group to reach with risk communication programs are the opinion leaders as these people look for risk information, they talk to others more than other people about the topic. We will first create both the general socio-demographical profiles as the media profiles of all four groups of information seekers. Secondly, we will focus on the specific information needs of the opinion leaders, as this group of people will play a key role in our risk communication strategy.

Socio-demographical profiles Terrorism I

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Gender	**58% male**	54% male	50% male	42% male
	43% female	46% female	50% female	58% female
	X^2=9.91, p<0.002 (0% Fe<5, min.Fe=88.93)			
Age (mean)	**40.04**	38.70	39.96	42.94
	F(3,957)=2.29, p=0.07			
Educational level	27% low	32% low	27% low	22% low
	29% average	30% average	31% average	22% average
	44% high	39% high	43% high	56% high
	X^2=14.67, p=0.02 (0% Fe<5, min.Fe=47.07)			
Income level € net / month	No sign. diff.			

Socio-demographical profiles Terrorism III

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Gender	**63% male**	51% male	43% male	45% male
	37% female	49% female	57% female	55% female
	X^2=15.85, p=0.001 (0% Fe<5, min.Fe=84.04)			
Age (mean)	**44.82**	39.02	46.65	45.97
	F(3,786)=8.74, p=0.000			
Educational level	2% low	28% low	29% low	44% low
	29% average	35% average	32% average	25% average
	43% high	37% high	38% high	30% high
	X^2=18.31, p=0.005 (0% Fe<5, min.Fe=52.20)			
Income level	**19% <1000€**	31% <1000€	17% <1000€	27% <1000€
€ net / month	**60% 1000€-2500€**	55% 1000€-2500€	70% 1000€-2500€	60% 1000€-2500€
	21% >2500€	15% >2500€	14% >2500€	13% >2500€
	X^2=19.39, p=0.004 (0% Fe<5, min.Fe=25.46)			

Socio-demographical profiles Terrorism IV

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Gender	**58% male**	50% male	44% male	46% male
	42% female	50% female	56% female	54% female
	X^2=14.38 p=0.002 (0% Fe<5, min.Fe=131.06)			
Age (mean)	**44.24**	39.67	47.15	41
	F(3,1490)=13.74, p=0.07			
Educational level	12% low	12% low	12% low	15% low
	35% average	39% average	40% average	37% average
	52% high	49% high	48% high	48% high
	X^2=14.67, p=0.02 (0% Fe<5, min.Fe=47.07)			
Income level	No sign. diff.			
€ net / month				

Table 44: Socio demographical profiles of information seekers in context of terrorism (4 studies)

When we compare the socio demographical profiles of the opinion leaders of the four studies, we can say that the opinion leaders in the context of terrorism are dominantly males (ranges from 58% to 63%) and the average age is 40 to 44 years old. We might also conclude that the opinion leaders have higher educational levels (43% to 52%). For income level, there has only been found significant differences in study III, so we will not state that opinion leaders differ significantly from the other groups for income as we did not find the difference in all four studies. There were no significant differences for residence (city or countryside), profession, marital status (divorced, married, living together, widow(er), or household composition (number of children). We will now provide an overview of the differences in the general concepts between the information seeker groups.

General concepts profiles Terrorism I

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Mental distance	**2.15**	2.57	2.48	2.83
	*F(3,956)=23.11****			
Risk perception	**3.95**	3.76	3.78	3.68
	*F(3,958)=19.28****			
Fear	**3.84**	3.57	3.61	3.27
	*F(3,957)=13.58****			
Behaviour	**2.66**	2.00	2.25	1.74
	*F(3,960)=49.83****			

General concepts profiles Terrorism III

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Mental distance	**2.29**	2.72	2.81	3.03
	*F(3,785)=16.75****			
Risk perception	**3.99**	3.61	3.51	3.20
	*F(3,786)=21.27****			
Fear	**2.95**	2.53	2.54	2.00
	*F(3,785)=30.29****			
Behaviour	**2.70**	2.32	2.09	1.89
	*F(3,779)=30.29****			

General concepts profiles Terrorism IV

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Mental distance	**2.21**	2.66	2.63	2.95
	*F(3,1481)=43.25****			
Risk perception	**3.78**	3.46	3.46	3.16
	*F(3,1486)=37.13****			
Fear	**2.89**	2.54	2.64	2.16
	*F(3,1492)=34.30****			
Behaviour	**2.93**	2.59	2.35	2.06
	*F(3,1331)=62.86****			

Table 45: General concepts profiles of information seeker in the context of terrorism (4 studies)

The results were consistent over the three studies, so we may conclude that the following pronouncements are valid and reliable. Opinion leaders consistently have the lowest mental distances towards the threat of terrorism, they perceive the terrorist threat as something that can happen in one's own environment and not only in countries that are at war or where 'terrorist leaders' live. Ignorants have the highest mental distances and perceive the risk as being further away from one's own surroundings. The risk perception levels are statistically higher for opinion leaders than for the other groups, while ignorants have the lowest risk perception levels. Fear levels are also statistically higher for opinion leaders. For the concrete behavioural intentions (personal safety measures etc.), opinion leaders score significantly higher than the other three groups, however, the levels do not exceed the average of 3 on the 6 point scale. These results are very relevant as governments should

now recognize the fact that opinion leaders, who are probably the most important risk communication target group since they look for information about terrorism and talk to others about it, have leveraged risk perception and fear levels (and lower mental distance levels) and higher behavioural intentions. It is not possible to lower the risk perception feelings since governments should not try to spirit away threat facts but it is possible to reduce the fear levels (even though they are not very high).
The construction of the media profiles of the information seekers might be useful to build concrete and targeted risk communication strategies. We will now discuss the primary results of these analyses.

Media profiles Terrorism I, Terrorism III and Terrorism IV

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Television	No sig. differences			
Internet				

Table 46: Media profiles information seekers in the four terrorism studies

There were no statistical differences in general media usage in all three studies. We will only discuss the specific media profile of the opinion leaders in the three studies as we consider them as our primary communication targets. We only integrated the media (tv station, newspaper, magazine and radio station) that had the highest percentages (%regulary-often-always). For study I and III, we integrated the option to indicate the specific media channels, for study IV, we opted to integrate the option to indicate the frequency of consultancy (for information seeking about terrorism) of the general media.

Specific media usage opinion leaders

Medium % regularly-often-always	**Terrorism I**	%	**Terrorism III**	%
Internet		24.7		40.5
Television station	TV1 (één)	79.3	TV1 (één)	82
	Canvas	68.2	Canvas	73.3
Newspaper	De Standaard	23.8	De Standaard	24.2
	Het Nieuwsblad	25.5	Het Nieuwsblad	31.9
	De Morgen	23.3	De Morgen	18.4
Magazine	Knack	26.4	Knack	25.2
	Humo	28.8	Humo	22.8
Radio station	Radio 1	31.4	Radio 1	34.8

Table 47: Specific media usage opinion leaders (study I and III)

Terrorism IV	%
Internet websites	27.3
Internet forums	5.5
Newspapers	80.3
Magazines	52.2
Television programs	86.1
Radio	68.4

Table 48: Specific media usage opinion leaders study IV

We can conclude that in general, especially television and newspapers are the media channels that are most consulted for information search about terrorism., followed by radio and magazines. Surprisingly, the internet is not mentioned as a medium that is used very often. We also conclude that, even though the general media usage questions in the terrorism IV study provides an overview of the general media consultancy, it is better to integrate the specific media channels in order to be able to create the specific media profiles of the target groups, e.g. the opinion leaders. We can derive from the descriptive results that opinion leaders consult the public broadcasting stations (één and Canvas) and that they mostly read the 'quality newpapers' (De Standaard, De Morgen) and Het Nieuwsblad. The most popular magazine is Knack. However, we do recognize the need for the integration of a more extensive media profiling instrument in the methodology. This may provide more specific information about the general and specific media usage of the target groups, such as the opinion leaders.

Opinion leaders' profile

To conclude the profiling of opinion leaders, we have summarized the most important characteristics in the subjoined overview.

Opinion Leader Profile

Male > Female

Average age: 40-45 years old

Mainly higher educated

Lower mental distance, higher risk perception higher fear level

Higher behavioral intentions

Higher needs for information

Table 49: General profile opinion leaders

This profile of the opinion leaders in the context of terrorism as a risk was retrtrieved in all three studies.
Besides the general media usage, we decided to add questions about the specific risk information needs in study IV. These questions provided us with some important information about the specific nature of the risk information that is sought. The next section will discuss the results.

8. Specific risk information needs in the context of terrorism

The next table compares the perception of risk information types in the context of terrorism of both non opinion leaders as opinion leaders (marked in **bold**). The most important differences were discovered when we compared the percentage of opinion leaders versus non-opinion leaders who appointed a score equal or higher than 7 on the 10 point scale of importance. These differences are graphically represented in the subjoined bar chart.

Risk info nature	**How often do you look for the following type of information**		**Mean score/10**	**St.Dev.**
	% rarely/never	% often/always		
Info about the probability that a terrorist attack will take place in Belgium	61	4	5.3	2.8
	36	**12**	**6.4**	**2.4**
General information about terrorism	52	3	5.2	2.6
	24	**9**	**6.3**	**2.2**
Specific info about recent terrorist attacks	29	8	6	2.5
	5	**26**	**7.4**	**1.8**
Info about the controllability of the risk	89	4	4.8	2.7
	46	**10**	**6**	**2.5**
Info about exposure to the risk	65	11	4.7	2.6
	39	**10**	**5.8**	**2.3**
Info about the consequences of an attack	57	4	5.2	2.5
	32	**11**	**6.4**	**2.3**
Guidelines about what to do during a terrorist attack	72	3	5.2	2.9
	52	**10**	**5.6**	**2.6**
Info about who's responsible	55	4	5	2.6
	32	**12**	**5.9**	**2.5**
Experiences of other people with the risk	77	1	4	2.4
	56	**5**	**5**	**2.5**
Info about similarity with other risks	75	6	3.9	2.4
	52	**6**	**4.8**	**2.5**
Opinion leaders analysis results are marked in bold				

Table 50: Specific risk information needs in the context of terrorism

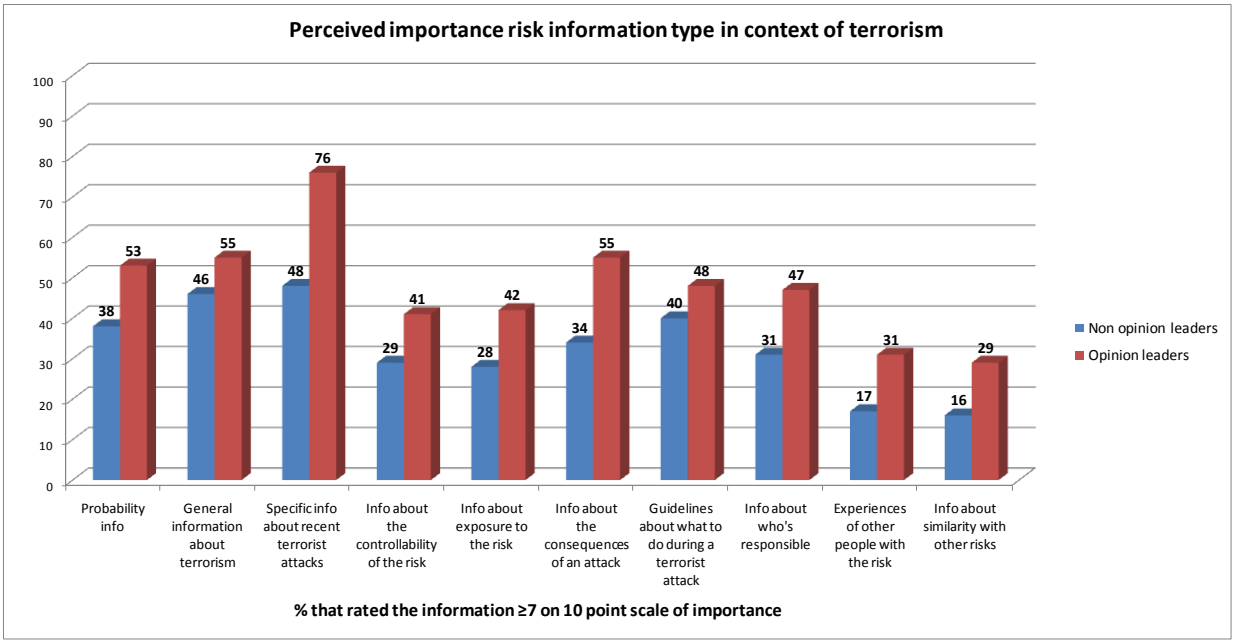


Figure 38: Perceived importance risk information type in the context of terrorism

Compared with the overall risk information needs of the general public, the opinion leaders have much higher percentages. The priorities in information perceptions are very similar, but both the % of opinion leaders that look for the information often/always as the % of opinion leaders that rate the information higher than 7 on the 10 point scale are much higher for all types of risk information. Same accounts for the general means. The information that is searched most often by opinion leaders is specific information about recent terrorist attacks (26% versus 8% for general public), the mean score for this type of information is 7.4 and 76% of the opinion leaders appointed a score higher than 7 (compared to 48% of the general public). The second and third most important types of information are information about the probability of a terrorist attack in Belgium (12% looks often/always, mean = 6.4 and 53% rated it 7 or more) and general information about terrorism (9% looks often/always, mean = 6.3 and 53% gave it a 7 or more). The other mean scores are all located around 6 to 7 on the 10 point scale, except for the info about similarity of the terrorist risk to other risks (mean score 4.8, 6% looks for this information often always and 29% appointed a score >7) and the experiences of other people with the terrorism as a risk (mean score 5, 5% looks for this information often/always and 31% appointed a score>7).

To conclude we can state that the % of opinion leaders that often or always look for risk information in the context of terrorism is higher than the figures of the general public and so are the mean scores that were appointed on the 10 point scale. For some types of information (general information, probability information and specific information about recent terrorist attacks), the percentage of opinion leaders that gave a score of 7 or more was much higher (10% to 20% difference) than for the general public.

9. Governmental communication

We will now discuss the results of the descriptive statistics analyses for the concepts that relate specifically to governmental issues, such as perceived roles of the government, trust in governmental institutes, reliability of the governmental information, the perceptions of the government as a dominant risk information controller and disperser, the general perceptions of the governmental risk communication in the context of terrorism and a general evaluation of the possible governmental risk communication channels. We will consistently split the results for the general public on the one hand and for the opinion leaders on the other hand. The analyses will deliver strong empirical proof for the differences between opinion leaders and the general public. Again, we want to integrate this dual interpretation of figures to indicate the specific profile of opinion leaders and the importance to take this group of people in special consideration when construing and implementing risk communication strategies.

9.1. Perceived roles of the government

In the last survey that we performed about terrorism as a threat (study IV), we decided to measure the public perceptions of the governmental roles: effective risk regulation in terms of preventing terrorist attacks by taking concrete safety measures, providing concrete and workable guidelines as an element of concise proactive risk and crisis communication and providing general information about terrorism as a risk, indicating and expanding the role of the government as a regulator to the leveraged role of the government as a risk communicator. The latter is rather novel but essential as governmental risk communication in the context of terrorism includes more than pre crisis communication but may also play an important role in increasing public understanding of the phenomenon and risk of terrorism and thereby invigorating communal resilience in the face of the mainly socially and medially constructed risk.

We decided to include both the means as indicators of centrality (with associated standard deviations) as the percentages of people who have low and high scores. The latter can also inform us about the percentage of people have a pronounced opinion about a statement, as means do not reflect information of this descriptive nature. Sometimes people do not have a pronounced opinion about certain issues. The statements were rated on a 6 point Lickert scale (1=Totally not important-6=Extremely important)

	Mean	St.Dev.	% Low	% High
Preventing terrorist attacks by taking concrete safety measures				
Non-OL	5.26	0.98	2	81
OL	5.46	0.79	3	88
	*t(948)=-4.35****			
Providing concrete guidelines to civilians				
Non-OL	4.58	0.98	3	55
OL	5.03	0.84	0	75
	*t(902)=-8.98****			
Providing general information about terrorism				
Non-OL	4.50	0.96	3	50
OL	4.95	0.82	0	71
	*t(910)=-9.05****			
Significance key * p≤0.05 ** p≤0.01 *** p≤0.001				

Table 51: Perceived roles of the government in the context of terrorism (study IV only)

The primary rol of the government is, as we expected, the risk regulation role. The mean is very high (for both opinion leaders as non opinion leaders) and 81% to 88% finds this role important to very important. The provision of concrete guidelines is also very important, however, we can clearly see the different perceptions of opinion leaders: 75% thinks that this role of pre crisis communication is important to very important compared to only 55% of the non opinion leaders ($mean_{OL}$>$mean_{NonOL}$). Same accounts for the provision of general information (risk communication): 71% of the opinion leaders versus 50% for non opinion leaders (and $mean_{OL}$>$mean_{NonOL}$). It is also very remarkable that the percentages of people who think that these roles are not/not at all important are very low: the percentages range from 0% to 3%.

We might conclude that the government is primarily perceived as a risk regulator, carefully preventing terrorist actions. However, we can also state that its role as a crisis and risk communicator is perceived very important as well, especially because only negligible percentages of respondents stated that these roles are not important. The noteworthy differences between opinion leaders and non opinion leaders support our general premise that governmental risk communication strategies should carefully constructed, taking into consideration the differences between various audiences that may play crucial roles in the risk information diffusion and two way communication and risk management strategy.

Of course, the concept of general trust in the governmental institutes is a crucial construct to scrutinize as well as the credibility of the government as a crisis and risk communicator will depend on its reputation and the general attitude of the public.

9.2. Trust in institutes

The general trust in governmental institutions is reflected in the perceived preparedness of the governments on the various levels (local, national, European) to cope with a terrorist attack.

Terrorism I

Degree of trust in following instances (5 point Likert scale)						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived preparedness European government			Male = 3.12 Female = 3.28			
Non-OL	3.21	0.94	*t (963)=-*		20	44
OL	3.14	0.90	*2.70***		24	40
Perceived preparedness national government						
Non-OL	3	0.89			28	33
OL	3	0.90			29	36
Perceived preparedness local government						
Non-OL	2	1			68	7
OL	2	0.94			71	11
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 52: Levels of trust in the various instances in the context of terrorism study I

Terrorism III

Degree of trust in following instances						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived preparedness European government						
Non-OL	3.27	0.93			20	48
OL	3.18	0.88			22	42
Perceived preparedness national government						
Non-OL	3.12	0.91			24	39
OL	3.02	0.85			25	31
Perceived preparedness local government				<35 year = 1.92 35-44 year = 2.09		
Non-OL	2.12	1.02		45-64 year = 2.19	65	10
OL	2.04	1.06		>64 year = 2.39	70	11
				*F(3,828)=7.50****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 53: Levels of trust in the various instances in the context of terrorism study III

Terrorism IV

Degree of trust in following instances						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived preparedness European government			Male = 3.36 Female = 3.49	<35 year = 3.56 35-44 year = 3.39		
Non-OL	3.46	0.85	*t (963)=-3.08***	45-64 year = 3.35	14	58
OL	3.35	0.95		>64 year = 3.33 *F(3,1541)=6.79****	20	54
Perceived preparedness national government						
Non-OL	3.26	0.90			20	47
OL	3.17	0.90			23	40
Perceived preparedness local government			Male = 2.26 Female = 2.36	<35 year = 2.12 35-44 year = 2.26		
Non-OL	2.29	0.94	*t (963)=-2.07**	45-64 year = 2.46	60	10
OL	2.36	0.89		>64 year = 2.40 *F(3,1542)=14.55****	56	10
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 54: Levels of trust in the various instances in the context of terrorism study IV

The figures point out that the perceived preparedness of the European government is slightly higher than the preparedness of the national government. However, both score fairly above the average of 2.5 on the 5 point Likert scale. The low trust levels in the local government is consistently found in the three studies (means range from 2 to 2.3 on the 5 point scale). When we take a look at the percentages, we see that only about 10% of the respondents have high perceived preparedness levels for the local government and that no less than 60% to 70% of the respondents in the three studies perceive the local governments as being unprepared. For the national and European government, these figures reflect an even dispersion and even more positive than negative perception of the preparedness (40%to 54% positive perceptions for the European government and 31% to 47% for the national government).

There were no statistically significant differences between opinion leaders and non-opinion leaders. Concerning gender differences, we could only statistically confirm the higher level of perceived preparedness for women of the European government in study I and study III and for the local government in study IV (even though the mean is still below the average of 2.5). So we might carefully state that women have slightly higher trust levels than men. For age differences, we can confirm that in study III and study IV, the older respondents (>45 years) have higher scores on perceived preparedness of the local government (however below the average).

The main conclusion that we can draw is that mainly the local government is perceived to be rather unprepared in the context of potential terrorist attacks. We consistently found this result in the three large scaled studies. This is contradictory to the general expectations that

local governments are the first in line to deal with potential crisis situations. It is important so set up the general objective to raise the general trust and perceived preparedness of local governments. This raise could contribute to the general construction of a communal resilience and a perceived preparedness climate so that risk and crisis guidelines will be taken at heart when they are communicated.

9.3. Reliability institutional information

Besides the general trust in governments as risk regulators (perceived preparedness), our second objective is to take a look at the trust in the governments as risk communicators. We will first compare the perceived reliability of the governmental information on various levels and then discuss the perceived governmental control of information flow.

Terrorism I

Degree of trust in following instances (5 point Likert scale)						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived reliability				<35 year = 3.43		
NATO info				35-44 year = 3.07		
Non-OL	3.21	0.88		45-64 year = 3.01	19	41
OL	3.22	1.0		>64 year = 3.13	23	43
				*F(3,1016)=15.42****		
Perceived reliability				<35 year = 2.01		
American info				35-44 year = 2.29		
Non-OL	2.24	0.95		45-64 year = 2.36	66	11
OL	2.19	1.0		>64 year = 2.64	68	15
				*F(3,1019)=16.97****		
Perceived reliability				<35 year = 3.48		
European info				35-44 year = 3.08		
Non-OL	3.26	0.86		45-64 year = 3.11	19	46
OL	3.27	0.97		>64 year = 2.98	24	51
				*F(3,1022)=19.21****		
Perceived reliability				<35 year = 3.44		
Belgian info				35-44 year = 3.10		
Non-OL	3.26	0.99		45-64 year = 3.12	21	47
OL	3.25	0.90		>64 year = 3.05	24	51
				*F(3,1020)=19.21****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 55: Trust levels of the governmental information in the context of terrorism study I

Terrorism III

Degree of trust in following instances						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived reliability				<35 year = 3.38		
NATO info				35-44 year = 3.06		
Non-OL	3.14	0.92		45-64 year = 2.97	23	39
OL	3.25	0.82		>64 year = 3.15	17	46
				*F(3,825)=10.79****		
Perceived reliability				<35 year = 2.09		
American info				35-44 year = 2.29		
Non-OL	2.32	0.96		45-64 year = 2.46	62	14
OL	2.43	1.03		>64 year = 2.76	57	18
				*F(3,828)=17.15****		
Perceived reliability				<35 year = 3.48		
European info				35-44 year = 3.24		
Non-OL	3.26	0.85		45-64 year = 3.12	19	46
OL	3.34	0.87		>64 year = 3.13	18	54
				*F(3,828)=10.29****		
Perceived reliability				<35 year = 3.52		
Belgian info				35-44 year = 3.24		
Non-OL	3.28	0.91		45-64 year = 3.11	20	50
OL	3.34	0.90		>64 year = 3.13	19	57
				*F(3,831)=11.89****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 56: Trust levels of the governmental information in the context of terrorism study III

Terrorism IV

Degree of trust in following instances						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived reliability			Male = 3.23	<35 year = 3.60		
NATO info			Female = 3.36	35-44 year = 3.28		
Non-OL	3.32	0.96	*t (963)=-2.64***	45-64 year = 3.13	19	51
OL	3.27	0.99		>64 year = 3.04	25	49
				*F(3,1540)=30.66****		
Perceived reliability				<35 year = 2.11		
American info				35-44 year = 2.23		
Non-OL	2.28	1.00		45-64 year = 2.30	67	15
OL	2.22	1.00		>64 year = 2.63	72	16
				*F(3,1542)=11.68****		
Perceived reliability			Male = 3.34	<35 year = 3.69		
European info			Female = 3.43	35-44 year = 3.30		
Non-OL	3.41	0.88	*t (963)=-2.03**	45-64 year = 3.25	18	58
OL	3.35	0.93		>64 year = 3.09	23	58

			*F(3,1537)=33.28****		
Perceived reliability			<35 year = 3.63		
Belgian info			35-44 year = 3.29		
Non-OL	3.39	0.89	45-64 year = 3.25	19	57
OL	3.33	0.95	>64 year = 3.07	24	58
			*F(3,1539)=26.09****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001				

Table 57: Trust levels of the governmental information in the context of terrorism study II

For the information that comes from NATO, European and Belgian sources (governmental institutes), the means are all very similar across all three studies: they vary from 3.14 to 3.43 on the 5 point Likert scale. The percentage of people that appoint high credibility scores varies from 39% to 58% and the percentage that appointed low credibility scores varied from 17% to 25%.

Based on these figures, we may state that the perceived reliability of the information that comes from these three sources is relatively high and stable in the context of terrorism. The advantage of this initially positive attitude towards the governments as risk information brokers is that one can build upon this positive image. We only found significant gender differences in study IV, indicating that women have slightly higher credibility rates for NATO and European information but since we only found these differences in the last study, we do not want to generalize this finding. We did find many significant differences between the age categories. In all three studies, the youngest age group (<35 years) has significantly higher credibility rates for NATO information (means vary from 3.38 to 3.60), European information (means vary from 3.48 to 3.63) and Belgian information (means vary from 3.44 to 3.63). The oldest age group (>64 years) consistently have the lowest scores on for these sources (means vary from 2.98 to 3.15).

Concerning the information that comes from American sources, the respondents were rather critical, the means vary from 2.19 to 2.43 and the percentages of respondents that allocate high credibility scores does not exceed 18% whereas the percentage of respondents that allocates negative scores varies from 57% to 72%. The data did not show any significant gender differences, but for age categories, we found the opposite results than for the other three sources: the oldest age category tends to allocate significant higher credibility scores and the youngest group (<35 years) the lowest scores.

Concerning the attitude towards American information, we can state that people do not perceive this information as credible and this mainly accounts for people in the youngest age category.

9.4. Governmental control of information flow (only terrorism IV)

Besides the trust in the government as a risk communicator, the perception about the dominant position of the government concerning risk information possession and diffusion is also related to the fact that people are more critical about the risk information that the

government spreads. We will discuss the general descriptive statistics about the governmental control of risk information in the next paragraph. We only integrated these items in the last study (study IV). The items were rated on 5 point Likert scales.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Information control government	3.86	0.90		<35 year = 3.87 35-44 year = 4.04 45-64 year = 3.79 >64 year = 3.86	9	78
Non-OL	3.85	0.90			10	75
OL				*F(3,1533)=3.79***		
We know everything that the government knows	1.64	0.79		<35 year = 1.55 35-44 year = 1.73 45-64 year = 1.67 >64 year = 1.93	86	2
Non-OL	1.69	0.80		*F(3,1539)=10.62****	86	2
OL						
Approval of government as selective info diffuser			Male = 3.52 Female = 3.38 *t (1541)=2.70***	<35 year = 3.38 35-44 year = 3.17 45-64 year = 3.55 >64 year = 3.51		
Non-OL	3.48	1.02		*F(3,1538)=7.27****	18	59
OL	3.34	1.01			22	51
	*t (1494)=2.51**					
Critical about govinfo						
Non-OL	3.85	0.83			7	75
OL	4.06	0.73			3	83
	*t (880)=-4.76****					
Need for participation				<35 year = 2.34 35-44 year = 2.45		
Non-OL	2.38	1.04		45-64 year = 2.78	58	16
OL	3.11	1.04		>64 year = 2.77	31	40
	*t (1494)=-12.18****			*F(3,1541)=19.21****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 58: Perceptions about governmental risk information flows in the context of terrorism

The perceived information control of the government is high: 78% of the respondents agrees (4 and 5 on scale) with the statement that that the governments decide what information about terrorism is being spread (mean = 3.9) and only 2% thinks that 'we' know everything that the government knows (mean = 1.6). So a large majority of the population recognize that the government controls the risk information flow about terrorism. It is remarkable that 51% (opinion leaders) to 59% (non opinion leaders) approves that the government is rather selective in spreading information about the risk of terrorism (means of 3.48 and 3.34). On the other hand, 75% (non OL) to 83% (OL) perceives themselves as being critical about governmental information about terrorism. Opinion leaders perceive themselves as more

critical about governmental information than non opinion leaders (mean 4.06 versus 3.85, t(880)=-4.76, p=0.000). Considering the specific need for active participation in the communication process with the government, the opinion leaders score significantly higher (mean = 3.11 versus 2.38 for non opinion leaders) and 40% of the opinion leaders has a positive score on this item versus 16% of the non opinion leaders. Furthermore, we found some significant and meaningful differences for between age groups. The youngest age group (<35 years) agrees the least with the statement that they know everything that the government knows and they have a significant higher need to participate in the communication process.

Apparently, the majority of the public puts up with the fact that the government is in control of the information flow but this feeling induces a kind of critical attitude towards the governmental information. It is also essential to recognize the differences between opinion leaders and the general public in terms of this critical attitude, relating with the fact that they have a higher need to participate in the communication flow with the governments. The latter is another argument to set up and give concrete form to a two-way communication platform that lends the possibility to the opinion leaders to retrieve and contribute to the information pool. Let us now take a closer look at the specific perceptions about the quantity and quality of governmental information.

9.5. General perception of government as risk regulator and risk communicator

First, we will discuss the satisfaction levels of the public with the quantity and quality (only study IV) of the governmental information about terrorism. In the first study, we only integrated one single item that reflected the satisfaction with the quantity of provided governmental information about terrorism. In study III and IV we added some more items and validated a 3 item scale (supra) that we labeled 'quantity of govinfo' (items rated on 5 point likert scales). The satisfaction with the quality of governmental information was only measured in study IV by means of 1 item.

Terrorism I

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
To what degree do you think that the government provides enough information about terrorism						
Non-OL	2.25	0.90			52	26
OL	2.25	0.99			61	24
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 59: Perceptions of quantity governmental risk information in the context of terrorism (I)

Terrorism III

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Quantity of govinfo						
Non-OL						
OL	2.63	1.12			51	27
	2.51	1.05			58	22
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 60: Perceptions of quantity governmental risk information in the context of terrorism (III)

Terrorism IV

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Quality of govinfo				<35 year = 3.38		
Non-OL	3.22	0.82		35-44 year = 3.09	17	41
OL	3.16	0.83		45-64 year = 3.11	19	37
				>64 year = 3.16		
				*F(3,1526)=12.08****		
Quantity of govinfo				<35 year = 2.87		
Non-OL	2.80	0.78		35-44 year = 2.68	52	11
OL	2.69	0.78		45-64 year = 2.71	62	10
				>64 year = 2.76		
				*F(3,1533)=4.96****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 61: Perceptions of quality and quantity governmental risk information in the context of terrorism (IV)

Concerning the satisfaction with the quantity of governmental information, the means were 2.25 in study I (1 item) and varied from 2.51 to 2.80 in study III and IV. These means, that should be interpreted on a 5 point scale, indicate that the public is quite neutral towards the quantity of information. However, when we take a look at the percentages, we notice that 51% to 62% of the people answer negatively (1 and 2 on 5 point scale) and are rather dissatisfied with the amount of information about terrorism that is being provided. Only 10% to 27% score positively. We did not find significant differences for gender and we only discovered some differences between age groups in study IV, but these differences were not really meaningful as we did not retrieve them in the other studies. People are more satisfied with the quality of information (means of 3.22 and 3.16). The percentage of people who rated the quality of information high was 37% (OL) and 41% (non OL). Only 17% assigned low scores to the quality item.

To conclude, we can state that in general, the public is rather satisfied with the quality of governmental information about terrorism, but there is a rather negative perception about the quantity.

9.6. Evaluation of communication channels

In the last study, we decided to integrate the perception of the suitability of certain communication channels that the government can use to provide risk information. The respondents were asked to rate the communication channels on 6 point Likert scales (1=totally not suited to 6=totally suited).

Communication channel	Mean	St.Dev.	% Low	% High
Tv advertisements				
Non-OL	3.47	1.54	28	27
OL	3.76	1.51	22	35
	*t (1493)=-3.30****			
Website				
Non-OL	4.22	1.21	10	43
OL	4.59	1.07	5	55
	*t (1488)=-5.53****			
Brochure				
Non-OL	4.17	1.21	10	41
OL	4.48	1.46	6	51
	*t (1488)=-4.42****			
Hotline				
Non-OL	3.84	1.35	17	33
OL	4.26	1.29	9	47
	*t (1484)=-5.51****			
Printmedia				
Non-OL	4.06	1.26	12	39
OL	4.35	1.94	7	49
	*t (1467)=-4.12****			
Experts				
Non-OL	4.23	1.32	11	47
OL	4.74	1.12	4	63
	*t (895)=-7.48****			

Table 62: Evaluation of the governmental risk communication channels (IV)

The means are rather high for most channels but moderate for tv advertisements. The most suitable communication channels are the experts: the means are 4.23 and 7.74 and 47% and 63% assign high scores (5 and 6 on 6 point scale) to the experts as an information source. Websites come in second place with means of 4.22 and 4.59 and percentages of 43% and 55% of people that rate the channels positively. The remaining channels are all very close to the website as a communication channel: brochures, print media and information hotlines. For all channels, the opinion leaders score significantly higher, probably because of their general need for more information and communication.

We would suggest composing the communication platforms based on the available resources, both in terms of time (some channels are more time-consuming than others) and

money. In any case, it is advisable to set up a small database of experts that are specialized in a certain matter and that can be enlisted to provide information through various news sources (TV news, print media interviews etc.). A website and a hotline are also essential communication channels as they lend themselves perfectly for two way communication flows. Brochures and tv advertisements are very costly and time consuming and cannot be put on rapidly.

The descriptive statistics have provided us with some very interesting and even vital information about the perceptions about the risk of terrorism and all the concepts that are related to it. We will now try to focus on these relationships between the various concepts by correlating the constructs and integrating some of them into structural models.

10. Multivariate analyses

10.1. Correlations

In this section, we will discuss the most remarkable findings and conclusions of the correlations between our key constructs. We decided to perform the correlations both for the non-opinion leaders and for the opinion leaders, as we assume that some correlations might be stronger for opinion leaders than for non-opinion leaders. The results for the opinion leaders are marked in italic. We marked the most important results in bold.

	Mental distance		Risk perception		Fear		Behaviour		Info need		Info seeking		Info sufficiency		Talk		Trust
	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	Non OL	*OL*	
Mental distance																	
Risk perception																	
Terrorism I	-0.21***	*-0.27****															
Terrorism II	-0.17	*-0.62****															
Terrorism III	-0.24***	*-0.38****															
Terrorism IV	-0.31***	*-0.35****															
Fear																	
Terrorism I	-0.05	*-0.15**	0.36***	*0.43****													
Terrorism II	-0.12	-0.68***	0.36***	*0.69****													
Terrorism III	-0.10*	-0.02	0.38***	*0.49****													
Terrorism IV	-0.10***	*0.18****	0.39***	*0.46****													
Behaviour																	
Terrorism I	0.08*	*-0.08**	0.19***	*0.41****	0.31***	*0.51****											
Terrorism II	-0.15	*-0.46***	0.20*	*0.20*	0.38***	*0.48***											
Terrorism III	-0.17**	*-0.14*	0.13***	*0.23****	0.27***	*0.47****											
Terrorism IV	-0.03	*-0.08*	0.22***	*0.22****	0.31**	*0.33****											
Info need																	
Terrorism IV	-0.23***	*-0.28****	0.27***	*0.27****	0.27***	*0.27****	0.34***	*0.30****									
Info seeking																	
Terrorism I	-0.16***	*-0.19****	0.26***	*0.24****	0.20***	*0.16****	0.21***	*0.09*									
Terrorism II	-0.07	*-0.38****	0.09	*0.27*	-0.001	*0.41**	-0.11	*0.25*									
Terrorism III	-0.19***	*-0.22****	0.17***	*0.19**	0.29***	*0.20****	0.18***	*0.25****									
Terrorism IV	-0.20***	*-0.19****	0.19***	*0.28****	0.27***	*0.20****	0.24***	*0.20****	0.42***	*0.38***							
Info sufficiency																	
Terrorism IV	-0.10***	*0.17****	-0.11***	*-0.07*	-0.10***	*-0.16****	0.02	*-0.03*	-0.17***	*-0.26****	-0.07*	*-0.08*					
Talk																	
Terrorism I	-0.35***	*-0.34****	0.18***	*0.01*	0.07	*0.03*	0.28***	*0.10*			0.36***	*-0.02*					
Terrorism II	-0.25***	*-0.34****	0.27**	*0.06*	-0.07	*0.12*	0.18	*0.08*			0.23*	*0.09*					
Terrorism III	-0.35***	*-0.28****	0.23***	*0.15**	0.18***	*0.03*	028***	*0.03*			0.34***	*0.23****					
Terrorism IV	-0.26***	*-0.15****	0.27***	*0.16****	0.14**	*0.14***	0.31***	*0.15***	0.36***	*0.21****	0.25***	*0.16****	0.01	*0.04*			
Trust																	
Terrorism I	0.06	*0.14**	-0.16***	*-0.30****	-0.05	*-0.10*	0.04	*-0.006*			0.001	*-0.10*			0.03	*0.04*	
Terrorism II	-0.01	*0.58***	0.02	*-0.52***	-0.08	*-0.52***	0.02	*-0.28*			0.08	*-0.31*			0.06	*0.28*	
Terrorism III	0.01	*0.01*	-0.01	*-0.14*	0.03	*-0.04*	0.07	*0.04*			0.16***	*-0.04*			0.05	*0.01*	
Terrorism IV	-0.003	*0.03*	-0.02	*-0.05*	0.10	*0.01*	-0.01	*-0.002*	-0.01	*-0.03*	0.05	*0.04*	0.08**	*0.05*	-0.01	*0.05*	
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001																

Table 63: Correlations between the general concepts in the context of terrorism

10.1.1.1. Correlations general concepts

In the following section, we will draw the most important and significant conclusions from the correlation tables. The correlation coefficients (r) vary from 0 (no linear relationship) to -1 (strongest negative linear relationship) or 1 (strongest positive linear relationship). The p-values for the correlation coefficients that are mentioned range from 0.000 to 0.05. We would like to refer to the p level indications in the correlation table above.

10.1.1.2. Mental distance, risk perception, fear and behaviour

The relatively strong negative linear relationship between mental distance and risk perception, r varies from -0.21 to -0.62, seems of course very logical as the higher the risk perceptions are, the lower the feeling will be that the risk of terrorism is something that takes place abroad. These concepts seem similar but when we take a look at the relationship between risk perception and fear levels, we discover relatively high significant positive correlations ($0.36 < r < 0.69$), which is not the case for the relationship between mental distance and fear. The correlation coefficients are somewhat higher for opinion leaders in this context. We can draw the same conclusion for the linear relationship between behaviour (intentions) and risk perception ($0.13 < r < 0.41$).We could state that explicit risk perception is more tangible than the more abstract construct of mental distance. As expected, the linear relationship between fear and behaviour was positive and relatively strong ($0.27 < r < 0.51$).

10.1.1.3. Risk perception, information seeking and social behaviour

When we take a look at the linear relationships between information seeking and the other concepts, we can state that information seeking correlates moderately negative with mental distance ($-0.38 < r < -0.16$) and moderately positive with risk perception (r varies from 0.17 to 0.28), fear ($0.16 < r < 0.41$) behaviour ($0.18 < r < 0.25$) and of course information need ($0.38 < r < 0.42$). For the relationship with social behaviour, there is a small but noteworthy difference between opinion leaders ($0.16 < r < 0.23$) and non opinion leaders, for whom we found more significant and stronger positive correlation coefficients over the four studies ($0.23 < r < 0.36$). This correlation is weaker for opinion leaders, probably because of the fact that they already have very low mental distances and high information seeking levels.
The relationship between mental distance and social behaviour (talk) is moderately negative ($-0.15 < r < -0.35$). People with low mental distances talk more to other people. However, we discovered another difference between opinion leaders and non opinion leaders in this context: we found significant moderate positive correlations between risk perception and social behaviour for non opinion leaders ($0.18 < r < 0.27$) but not for opinion leaders ($0.15 < r < 0.16$). This difference could be explained by the fact that opinion leaders already have high

scores on social behaviour and do not necessarily need to have high risk perception levels to talk to other people about terrorism. It is a nice finding that people who have higher risk perception levels also have higher needs to talk to others.
So to summarize all these descriptive relationships, we can draw the following conclusions:
High levels of risk perception and low levels of mental distance correlate significantly with the need for information and some concrete behavioural efforts like information seeking, concrete behavioural actions (or plans) and social behaviour (talking to others). Fear is also correlated with risk perception of course (same as for fear and behaviour, except for social behaviour) and people who have higher fear levels will also look for information about the risk. So people who are more afraid will take more concrete actions and will have a greater need for information and vice versa.
It is however remarkable that fear is highly correlated with risk perception, but not with mental distance. Combined with the results of the descriptive statistics in the previous part of this report, which stated that there is only a small percentage of people that actually thinks that an attack will occur in Belgium and on the contrary, 59% to 71% of the people (over the three studies) perceive the terrorist threat as a rather proximate risk, we can assume that the risk of terrorism is something that is mainly medially constructed, and the media bring the threat closer in the mental perceptions of people, but on the other hand, the concrete perceptions of the probability of an attack and the concrete involvement of a person in this attack is very low. So even though the risk is perceived to be near, the people are not really afraid to be involved, probably because of the personal invulnerability bias and especially the denial bias (Thompson, 1985). These psychological defense mechanisms allow human beings not to be preoccupied with the evaluation of personal risk, which would only induce increased levels of chronic anxiety and stress (Handmer & Penning-Rowsell, 1990). They are extensively discussed in chapter four 2.6.1. We will now draw conclusions about the linear relationships between the concepts that are all related to governmental communication.

10.1.2. Correlations governmental communication

We integrated the perceived quality, quantity and reliability of the governmental information about terrorism with the general trust in the government, information seeking, and the information need and information sufficiency.

	Quality govinfo		Quantity govinfo		Reliability govinfo		Trust		Info need		Info seeking	
	Non OL	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***
Quality govinfo												
Quantity govinfo												
Terrorism IV	**0.52*** **	***0.51*** **										
Reliability govinfo												
Terrorism III	**0.42*** **	***0.40*** **	**0.44*** **	***0.40*** **								
Terrorism IV			**0.39*** **	***0.43*** **								
Trust												
Terrorism III			**0.42*** **	***0.46*** *	**0.27*** **	***0.26*** **						
Terrorism IV	**0.27*** **	***0.34*** **	**0.38*** **	***0.35*** **	**0.28*** **	***0.23*** **						
Info need												
Terrorism IV	**-0.19*** **	***-0.36*** **	**-0.15*** **	***-0.27*** **	**-0.03**	***-0.24*** **						
Info seeking												
Terrorism III			-0.05	*0.02*	-0.02	*-0.11*	0.16**	*-0.04*				
Terrorism IV	**-0.05**	***-0.15*** *	-0.04	*-0.10**	-0.02	*-0.17***	0.05	*-0.03*				
Info sufficiency												
Terrorism IV	**0.25*** **	***0.14*** *	**0.28*** **	***0.21*** **	**0.11** *	***0.18*** **	0.08**	*0.04*	**-0.17*** **	***-0.26*** **	-0.07*	*-0.08*
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001											

Table 64: Correlations between the governmental risk communication concepts in the context of terrorism

There are very high positive linear relationships between information quantity, quality and reliability, the correlation coefficients between these concepts all vary between 0.40 and 0.52 and are significant at the 0.001 level. There are also a relatively high correlations with the general trust in the government ($0.23 < r < 0.46$), especially for the satisfaction with the quantity of governmental information ($0.35 < r < 0.46$). There are also significant negative correlations between information need and satisfaction with information quality and quantity so people who are not satisfied with the information quantity and quality will need more information and vice versa. The latter conclusion accounts primarily for opinion leaders. The correlation coefficients are much higher for opinion leaders than for non opinion leaders ($r=-0.36$ versus $r=-0.19$ for relationship information need and $r=-0.27$ versus $r=-0.15$ for quantity), especially for the relationship between information reliability and information need ($r=-0.03$, non significant, versus $r=-0.24$ for opinion leaders).
These results indicate that it is absolutely necessary to provide enough and qualitative information because these concepts do not only correlate strongly with each other but also with the perceived reliability of the information and the general trust in the government.
We will try to validate these multivariate relationships in three structural equation models.

10.2. Structural equation models

Structural equation modelling (SEM) procedures were used to test the plausibility of the postulated models. Several authors have acknowledged the growing importance of structural equation modelling for testing causal relationships and interdependency in behavioural and social sciences (Baumgartner & Homburg, 1996; Byrne, 2001; McDonald, 2004; McDonald & Ho, 2002; Schulze, 2007; Stephenson & Holbert, 2003) and more specifically communication research (Stephenson & Holbert, 2003), especially when latent variables are integrated in models. With structural equation modelling it is possible to statistically test and confirm hypothesized multivariate models and it allows researchers to test a set of regression equations and covariance structures simultaneously. The structural relationships can be modelled graphically to conceptualize the theoretical assumptions more clearly (Byrne, 2001). Ter Huurne has summarized a variety of advantages of structural equation modelling compared to more traditional statistical analytical techniques (E. F. J. Ter Huurne, 2008 p. 24). She bases herself on MacCallum and Austin (2000) and Stephenson and Holbert (2003). Firstly, she indicated that SEM is rather a confirmatory than an exploratory technique. It is clear that we will have to construct a hypothetical model at first and define the relationships between the integrated concepts. Secondly, SEM offers the possibility to explicitly estimate error variance parameters. Last but not least, SEM allows the researcher to integrate both manifest (observed) as latent (unobserved) variables into the model which makes it possible to analyze the relationships between concepts on higher, unobserved levels: “SEM is a technique used for specifying and estimating models of linear relationships among variables. Variables in a model may include both measured variables and latent

variables" (MacCallum & Austin, 2000 p. 202). So structural equation modeling allows us to test the overall fit of our model.
Amos, a statistical software package for SEM was used to estimate the parameters. The chi-squared p- value should exceed 0.05, however, with large samples, this value is not reliable. To counter this, we performed chi-square analyses on random, small sub-samples (approx. 10% of the sample) of 150 respondents. The use of chi-square is appropriate for sample sizes between 100 and 200 (Hair, Anderson, Tatham & Black, 1998). All other analyses were performed on the full samples (n_{TI}=1040, n_{TII}=160, n_{TIII}=851 n_{TIII}= 1558). The model fit was assessed by means of the Comparative Fit Index (CFI), the Normed Fit Index (NFI), the Tucker-Lewis Index (TLI). The values of these Goodness of Fit measures should exceed 0.90 (Hair, Anderson, Tatham & Black, 1998). The Root Mean Square Error of approximation (RMSEA) was calculated. Values from 0.05 to 0.08 are deemed acceptable, but are preferable less than 0.05. Firstly, we will test one simple model that depicts the relationship between the perception of the government as a risk communicator and as a risk regulator. We will test it with the data of the four studies. The second model will integrate the satisfaction with the possibilities to participate in the communication flow (bottom-up communication). In the third model, we will add the specific need for communication participation and opinion leadership, the concept that is closely related to this need.

10.2.1. Relationship between the perceived roles of the government

10.2.1.1. Study I, II and III

In study I, II and III, we did not yet integrate the concept of quality of governmental information. That is why the first model does not include this concept. The model depicts the relationship between the satisfaction with the government as a risk communicator and the satisfaction with the government as a risk regulator. The chi-squared p values for the full samples were smaller than 0.001 in study I and III. When we performed the analysis on a random sample of 150 cases, the chi-squared p-valued were 0.33 and 0.58, which proofs that the actual (observed) and the model implied covariance matrices not statistically different. Based on the data in study II, the chi-squared p value was 0.21. This means that the proposed model fits the observed covariances and correlations well in all three studies. The NFI, CFI and TLI values all exceed the critical value of 0.90 and the RMSEA values (0.037, 0.054 and 0.06) are all excellent.

The government as a risk communicator is presented as a latent variable (not measured) that is measured by two manifest variables: satisfaction with the quantity of governmental information (quantity govinfo) and the perceived reliability of the governmental information in the context of terrorism (reliability govinfo). The first concept (quantity) was measured by means of one single item in study I and II and by means of three items in study III and IV (alpha=0.77 and 0.73). The perceived reliability of governmental risk information in the

context of terrorism was measured by one single item. The regression weights (standardized beta values, marked in *italic*) of the two variables that measure quantity are all very high and the satisfaction with the quantity of governmental information has the largest weight in the prediction of the perception of the government as a good risk communicator (beta ranges from 0.68 to 0.76, p<0.001) followed by the reliability of governmental information (beta ranges from 0.48 to 0.58, p<0.001).

The perception of the government as a risk regulator is a latent variable, measured by three manifest variables. The perception of the governmental initiatives to secure public places (1 item) is the most important predictor (beta varies from 0.61 to 0.67, p<0.001), followed by the perceived preparedness of governmental services (construct with 8 items, alpha's vary from 0.85 to 0.89 and beta values vary from 0.58 to 0.69, p<0.001). Securing infrastructure (beta varies from 0.51 to 0.63, p<0.001) is the weakest predictor. The most important conclusion from this analysis is that the total amounts of explained variance in the perception of the government by the perception of the government as a risk communicator are as follows: 65% in study I (beta=0.80, p<0.001), 86% in study II (beta=0.93, p<0.001) and 41% in study III (beta=0.64, p<0.001). These explained variances are high. To summarize, we have added a table with an overview of the general parameters of fitness and the pathmodel.

Study	Chi^2/df/p	Chi^2/df/p for n =150	NFI	CFI	TLI	RMSEA
Terrorism I	9.67 / 4 / 0.046	4.61 / 4 / 0.33	0.99	0.99	0.97	0.037
Terrorism II	5.82 / 4 / 0.213		0.96	0.99	0.95	0.054
Terrorism III	16.13 / 4 / 0.003	2.89 / 4 / 0.58	0.98	0.98	0.93	0.06

Table 65: Overview of the general parameters of fitness of the basic SEM models in the context of terrorism (I, II and III)

M_{error} stands for the measurement error related to the observed variable and S_{error} stands for the structural error.

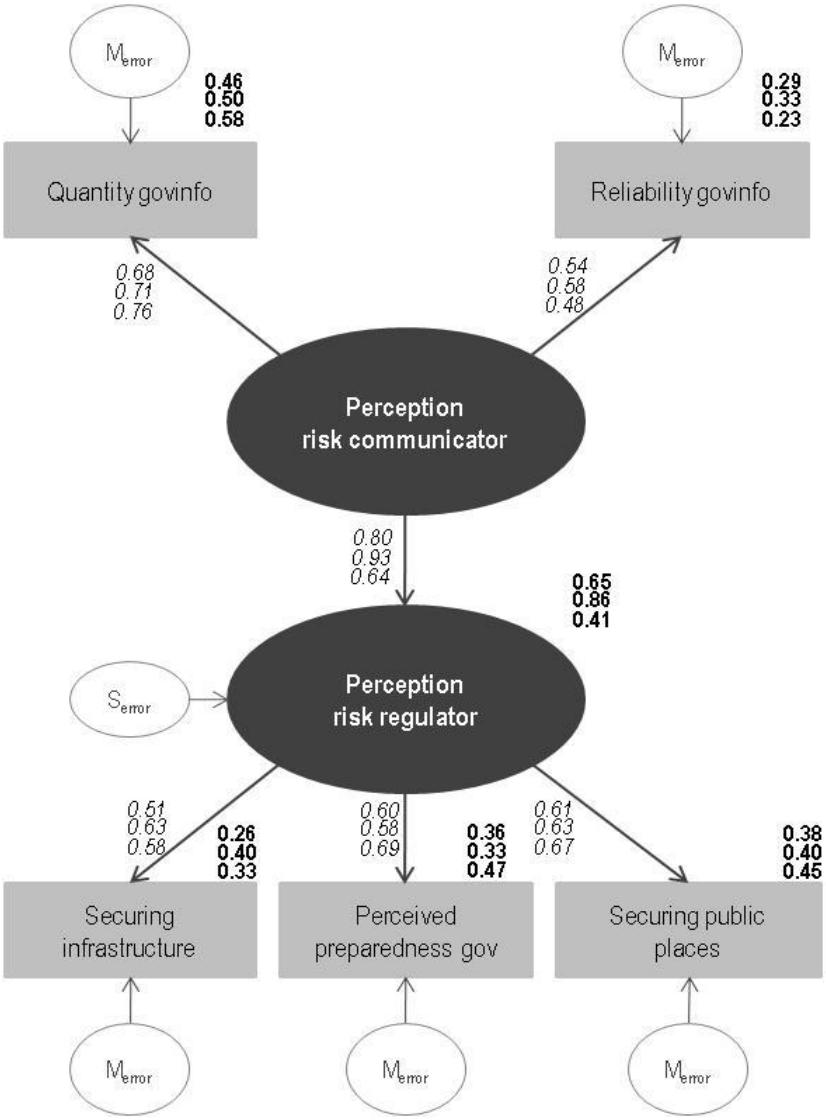


Figure 39: SEM integrating the relationship between the perceptions of the government as a risk regulator and as a risk communicator in the context of terrorism (study I, II and III)

Study IV

In study IV, we have added the concept of perceived quality of governmental risk information (1 item) to measure the latent concept of the government as a risk communicator. The table below provides us with an overview of the goodness of fit parameters. The chi squared p value for the full sample (n=1558) was too low, so we performed the analysis on a small subsample, resulting in an acceptable p value of 0.06. The goodness of fit indices were very high (NFI, CFI, TLI all exceed 0.90 abundantly) and the RMSEA value was good (0.059).

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Terrorism IV	51.13/8/0.00	6.42 / 8 / 0.06	0.97	0.98	0.98	0.059

Table 66: General parameters of fitness of the basic SEM model in the context of terrorism (IV)

As the model depicts, the perception of the government as a risk communicator is a latent variable that is measured by the three manifest variables: satisfaction with the quantity and quality of the governmental information about terrorism and the perceived reliability of the information. The regression weights (standardized beta values, marked in *italic*) of these three variables are all very high and the satisfaction with the quantity of governmental information has the largest weight in the prediction of the perception of the government as a good risk communicator (beta=0.74, p<0.001), followed by quality of governmental information (beta=0.71, p<0.001) and reliability of governmental information (beta=0.55, p<0.001). The perception of the government as a risk regulator is a latent variable, measured by three manifest variables. The perception of the governmental initiatives to secure public places is the most important predictor (beta=0.50, p<0.001), followed by securing infrastructure (beta=0.43, p<0.001). The perceived preparedness of governmental services is the weakest predictor (beta=0.16, p<0.001). The most important conclusion from this analysis is that the total amount of explained variance in the perception of the government by the perception of the government as a risk communicator is 54%, which is rather high (beta=0.73, p<0.001).

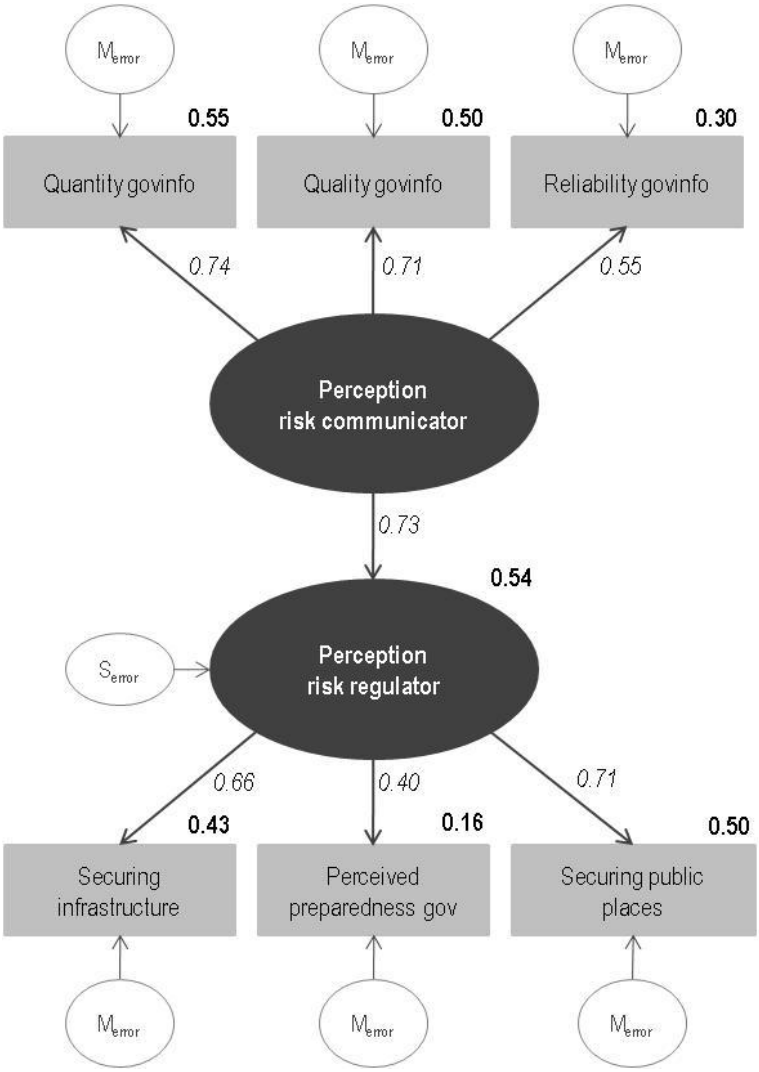


Figure 40: SEM integrating the relationship between the perceptions of the government as a risk regulation and as a risk communicator in the context of terrorism (IV)

To conclude, we can state that there is statistical proof for the following causal relationship: the better people perceive the government as a good risk communicator, the better the government will be perceived as a risk regulator.

10.2.2. Linking the perception on possibilities of participation in communication

In a second phase, we added the variable that measures how strongly people agree with the statement that citizens get the possibility to communicate with the government about terrorism. This reflects their view on the possibility of bottom-up communication.
After testing diverse models, a nice result was found when we linked this item directly to the perception of the government as a risk communicator. The chi-squared p-value (0.41 for n=140), goodness-of-fit measures (NFI, CFI, TLI >0.90) and the RMSEA value (0.048) all proof that the model is good. We found a quite strong negative relationship between the latent variable perception risk communicator and negative perception participation (beta=-0.40, p<0.001) and 16% of the variance in the latter is explained by the latent variable.

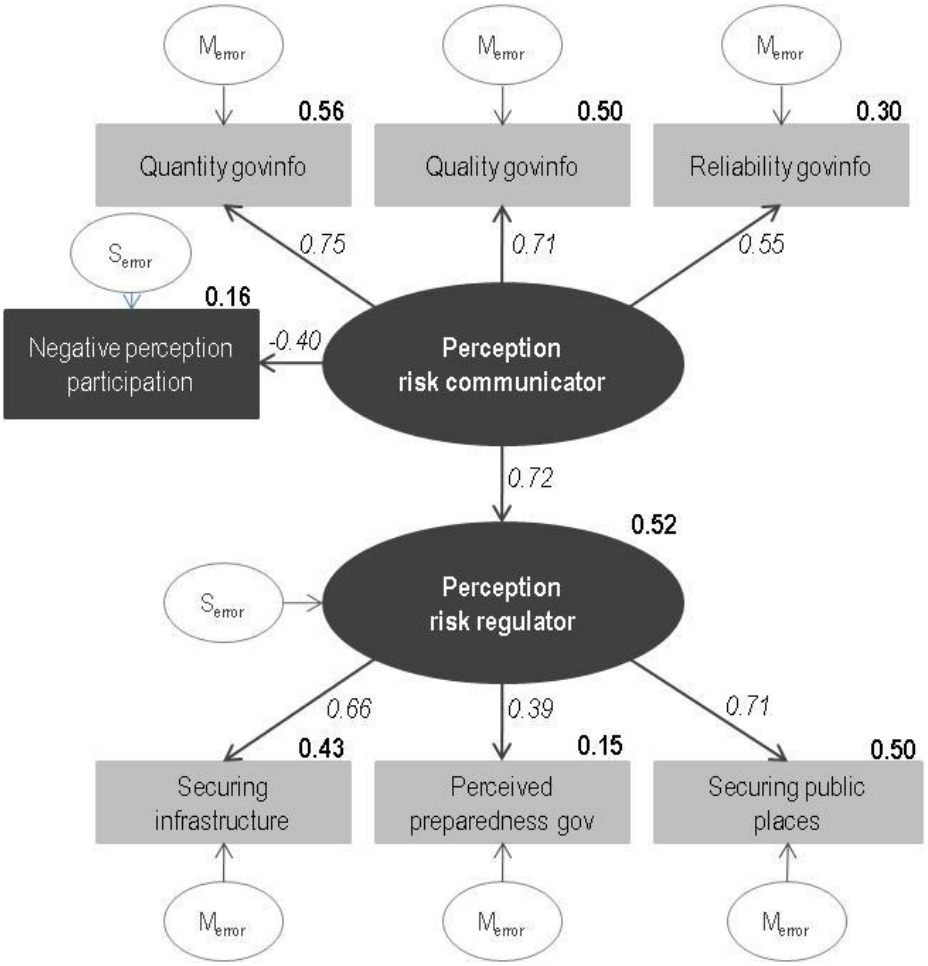


Figure 41: SEM linking the perception of possibilities of participation to the basic model in the context of terrorism (IV)

Study	Chi²/df/p	Chi²/df/p for n =140	NFI	CFI	TLI	RMSEA
Terrorism IV	59.82/13/0.00	13.58 / 13 / 0.41	0.97	0.98	0.95	0.048

Table 67: General parameters of fitness of the SEM model linking participation to the basic model in the context of terrorism (IV)

So we can say that the more people are satisfied with the government as a risk communicator, the less they will think that there is no possibility for bottom-up communication. The next step was to determine whether the need for bottom-up communication correlates with the satisfaction with the government as a risk communicator, taking into account the opinion leadership principle.

10.2.3. Incorporating the need for bottom-up communication and opinion leadership

A last variant of the model integrates the need for communication with the government about terrorism and the concept of opinion leadership. As mentioned before, the opinion leadership concept is measured by five items (alpha = 0.76) that unite information seeking variables (extend to what people look for information about terrorism in general) and social behaviour variables (extend to what people consider themselves as opinion leaders and talk to others about terrorism). Again, the chi-squared p-value (0.53 for n=150), goodness-of-fit measures (NFI, CFI, TLI>0.90) and the RMSEA value (0.048) all proof that the model is good. The results show us that the satisfaction with the government as a risk communicator has a negative causal relationship with the need for bottom-up communication (beta=-0.21, p<0.001) which means that the more people are satisfied with the government as a communicator, the less they will feel the need to communicate with the government about terrorism themselves. We can also state that the opinion leadership concept has a quite strong positive causal relationship with the need for bottom-up communication (beta=0.40, p<0.001) which means that the higher people rate on opinion leadership, the more they will feel the need to exchange knowledge with the government about terrorism. Opinion leadership and satisfaction of the government as a risk communicator together explain 20% of the variance within the variable that measures the need for bottom-up communication.

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Terrorism IV	86.42/19/0.00	30.59 / 13 / 0.053	0.96	0.97	0.94	0.048

Table 68: General parameters of fitness of the SEM model linking bottom-up communication and opinion leadership in the context of terrorism (IV)

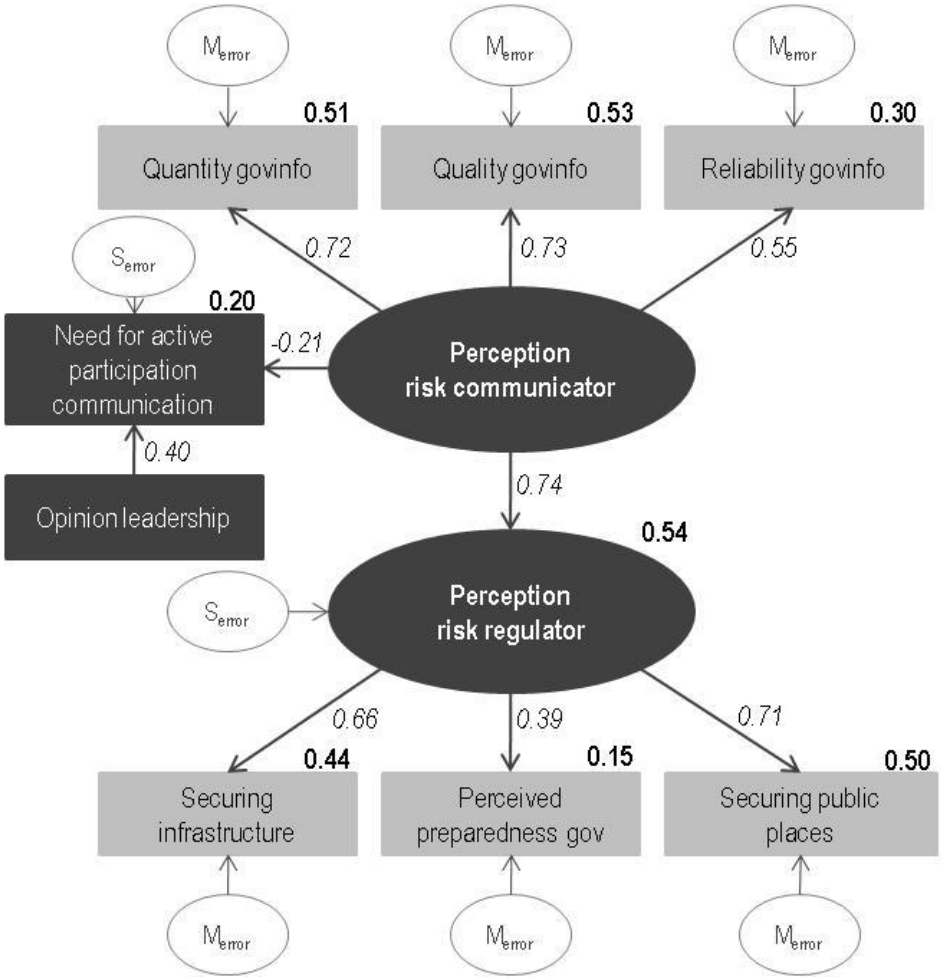


Figure 42: SEM linking bottom-up communication and opinion leadership in the context of terrorism (IV)

So for governments, it is important to communicate effectively, but also to determine who those opinion leaders are and how they can be reached, because this group of people that is characterized by a high level of influence on other social groups within society and an extensive information searching behaviour will feel the need to communicate about terrorism.

10.2.4. Conclusion structural equation models

The models provide us with statistical evidence that the better people perceive the government as a good risk communicator, the better the government will be perceived as a risk regulator. This evidence can be used to convince governments to put more efforts in creating efficient communication strategies that increase the public's satisfaction with the amount, quality and reliability of the provided information. The gain of trust in the government as a risk communicator will result in an increase of trust in the government as a risk regulator, perceived to be able to prevent terrorist attacks. Besides this increase in trust, citizens will also be less critical about the statement that there is no room for bottom-up communication. Moreover, citizens will feel less need to communicate with the government

about terrorism, probably because they are confident in the fact that the government controls the risk. However, the opinion leaders are a special group of people that extensively search information about terrorism, talk about the topic to others and perceive themselves as opinion influencers. The results show us that this group of people will need to communicate for example to exchange knowledge. Governments should take initiatives to create communication platforms to provide citizens, and especially the opinion leaders who will normally quite rapidly seek access to these platforms, enough, qualitative and reliable information.

11. General conclusion research report I

In this first research report, we presented an overview of the results of four quantitative survey studies that scrutinized the risk perception construct and its related concepts in the context of terrorism. We were able to collect a lot of data in four main datasets (n_I=1040, n_{II}=160, n_{III}=851, n_{IV}=1558). These data allowed us to construct, confirm and validate our main measurement scales to measure the key concepts that surround risk perception in the context of terrorism. Let us confront the results of the analyses with the central research objectives.

The first, descriptive part provided a clear descriptive report on the perceived risk of terrorism and the related concepts of mental distance, fear, protective behaviour, information seeking behaviour and social behaviour. The analyses results in the report provided us with some interesting depicting results.

For the concepts of risk perception, mental distance, level of fear and behaviour (intentions), the descriptive figures indicate that, even though the majority of the respondents perceive the terrorist threat as a risk that is very near (mental distance), the actual percentage of people who have a high probability level, who are affected in their fear levels and behavioural intentions, who talk a lot to others about the topic and who indicate that they look for information about terrorism is low. Another remarkable finding is that a lot of people answer quite neutrally (3 and 4 on 6 point scales), which indicates that the majority does not really have an outspoken opinion, probably because the risk is not transparent and especially because the Belgian population have not (yet) been confronted with terror attacks.

A separate descriptive part was written about the public perceptions of the government as a risk regulator and risk communicator. We might conclude that the government is primarily perceived as a risk regulator, carefully preventing terrorist actions. However, we can also state that its role as a crisis and risk communicator is perceived very important as well, especially because only negligible percentages of respondents stated that these roles are not important. For the specific trust in the government as a risk regulator, we assessed the perceived preparedness of the governments on four levels. The data revealed that mainly the local government is perceived to be rather unprepared in the context of potential terrorist attacks. We consistently found this results in the three large scaled studies. This is

contradictory to the general expectations that local governments are the first in line to deal with potential crisis situations. It is important so set up the general objective to raise the general trust and perceived preparedness of local governments. This raise could contribute to the general construction of a communal resilience and a perceived preparedness climate so that risk and crisis guidelines will be taken at heart when they are communicated. Also the perceived reliability of the information that comes from the three governmental sources that we included (NATO, European government and national government) is relatively high and stable in the context of terrorism. The advantage of this initially positive attitude towards the governments as risk information brokers is that one can build upon this positive image. Closely linked to the concept of reliability and certainly not negligible is the concept of perceived information flow control of the government. Apparently, the majority of the public puts up with the fact that the government is in control of the information flow but this feeling induces a kind of critical attitude towards the governmental information. Concerning the satisfaction with the quantity and quality of the governmental information we can state that the public is rather satisfied with the quality of governmental information about terrorism, but there is a rather negative perception about the quantity. For the usage of specific communication channels, we would suggest to compose the communication platforms based on the available resources, both in terms of time (some channels are more time-consuming than others) and money. The data revealed that the usage of experts as risk information sources is the best way to provide information. In any case, it is advisable to set up a small database of experts that are specialized in a certain matter and that can be enlisted to provide information through various news sources (tv news, print media interviews etc.). A website and a hotline are also essential communication channels as they lend themselves perfectly for two way communication flows. Brochures and tv advertisements are very costly and time consuming and cannot be put on rapidly. They can however be useful for longer term informing communication campaigns. For the satisfaction of immediate risk information needs, the quick response communication platforms that offer two way interactive communication flow possibilities (e.g. website, hotline) are the best channels to use to appease the first information needs.

For risk information seeking behaviour, only 4% to 8% of the respondents actively seek for risk information in the context of terrorism. The percentage for event triggered information search is higher (16% to 26%). The percentage of people that passively scan information is not much higher (16% to 19%) but the means vary from 3.9 to 4.2, which is higher than with event triggered information search. So the pyramidal structure for information seeking categories, ranging from intensive information seeking to passive information scanning is empirically confirmed. Concerning the type of information that is perceived by the population as most important to be communicated, the most successful are specific information about recent attacks, probability information, guidelines about what to do in case an attack occurs and general information about terrorism. We interpret these concrete needs of information as a signal to provide information that can satisfy the need for personal information control as a substitute of personal risk control. As the risk of terrorism cannot be

controlled by the individual himself since its unpredictable and untransparent nature, it is assumable that the locus of risk control will shift to a locus of personal information control so that the individual is able to construct his own perceived risk reality. We could wonder why we should communicate more when these describing results are indicating that only a certain proportion of the population is actually looking for information about terrorism. The answer is that we should especially communicate more effectively by creating customized target based risk communication strategies. We can only create these strategies when we have gained sufficient knowledge about the dynamics that play within the social structures of the society. How does risk information spread and what is the role of opinion leaders within these dynamic processes? We already formulated a theoretically based answer on this question in chapter four (3.) of this doctoral dissertation. It was of course one of our challenges to try to empirically confirm our theoretical propositions by means of our four datasets. This challenge has been successfully accomplished and will be discussed now in the discussion of the second objective.

This second objective was to develop a typology of risk information seekers. Based on our first study, we managed to confirm a primary empirically based classification of risk information seekers. We tried to classify the seekers, based on their specific information seeking behaviour (active, passive and event triggered information seeking), on their specific social behaviour in the context of terrorism (talking to others about the risk) and finally on their specific perception of the opinion leadership trait within themselves. In the first study, the best solution of the exploratory cluster analysis unveiled four main groups of information seekers: opinion leaders, talking scanners, silent seekers and ignorant. The clustering was based on the main dimensions that we defined on the basis of the literature: information seeking, split up in active seeking, passive scanning and even triggered information seeking, social behaviour and the presence of a specific opinion leadership trait. The four group solution was retrieved in all four studies and the percentages were comparable. The results of the discriminant analyses confirmed the four group solution and in the four studies, the classification matrix showed that we could scientifically predict the group membership by means of the five predictors. For the opinion leaders, the best predictors (according to the discriminant analysis) are event triggered information search and the specific opinion leadership trait. This finding is consequently revealed across the four studies. The socio demographical profiles were stable as well over the four studies. The four groups also had very specific results for the general concepts, indicating that the groups really had a specific profile concerning risk perception, mental distance, fear and behaviour. The main conclusion is that we were able to identify our primary communication target group: the opinion leaders. The opinion leaders have a very distinct but stable profile across the four studies in the context of terrorism. They are mainly male with an average age of 40 to 45 years and they are mainly higher educated. The opinion leaders differ significantly from the other groups on the main concepts that surround risk perception. They have significantly lower mental distances and higher risk perception levels, so their perception of terrorism as a potential threat is stronger. Their fear level is higher as well, but still does not

exceed the average. Higher fear levels are also accompanied with a higher level of behavioural intentions and concrete behaviour. Since we clustered the groups also on information seeking behaviour, it is obvious that their risk information seeking behaviour and social behaviour in the context of terrorism is higher than for the other groups. These results are very relevant as governments should now recognize the fact that opinion leaders, who are the most important risk communication target group since they look for information about terrorism and talk to others about it, have leveraged risk perception and fear levels (and lower mental distance levels) and higher behavioural intentions. Compared with the risk information needs of the general public, the opinion leaders have much higher percentages for all types of risk information in the context of terrorism. The priorities in information desire are very similar, but both the frequency of risk information search as the perceived importance of all types of risk information are much higher for opinion leaders than for the other information seeking groups. Opinion leaders also have very distinct perceptions about the role of the government as a risk communicator. Their satisfaction with the quantity and quality of governmental information is as low as for the non opinion leaders. On the other hand, concerning the perceived suitability of the potential governmental communication channels to communicate about terrorism, the opinion leaders have significant higher scores on all channels, probably because their greater initial need for risk information. It is also essential to recognize the differences between opinion leaders and the general public in terms of this critical attitude, relating with the fact that they have a higher need to participate in the communication flow with the governments. The latter is another argument to set up and give concrete form to a two-way communication platform that lends the possibility to the opinion leaders to retrieve and contribute to the information pool.

Now we have discovered the four types of risk information seekers and identified our main communication target group, the opinion leaders, we have gained valuable knowledge to create a tangible risk communication strategy. We were able to create their socio demographical profile and to detect their specific risk information needs.

The third research objective included the analyses of the linear relationships between risk perception and the related concepts in the context of terrorism and validate the SEM model that scrutinizes the relationship between risk regulation and communication. For the general concepts, the correlation matrix revealed that high levels of risk perception and low levels of mental distance correlate significantly with the need for information and some concrete behavioural efforts like information seeking, concrete behavioural actions (or plans) and social behaviour (talking to others). Fear is also correlated with risk perception of course (same as for fear and behaviour, except for social behaviour) and people who have higher fear levels will also look for information about the risk. So people who are more afraid will take more concrete actions and will have a greater need for information and vice versa. It is however remarkable that fear is highly correlated with risk perception, but not with mental distance. Combined with the results of the descriptive statistics in the previous part of this report, which stated that there is only a small percentage of people that actually thinks that

an attack will occur in Belgium and on the contrary, 59% to 71% of the people (over the three studies) perceive the terrorist threat as a rather proximate risk, we can assume that the risk of terrorism is something that is mainly medially constructed, and the media bring the threat closer in the mental maps of people, but on the other hand, the concrete perceptions of the probability of an attack and the concrete involvement of a person in this attack is very low. So even though the risk is perceived to be near, the people are not really afraid to be involved. We allocated this to the denial and the invulnerability biases, as defined by Thompson (1985).

The results in our correlation table about the governmental communication indicate that it is absolutely necessary to provide enough and qualitative information because these concepts do not only correlate strongly with each other but also with the perceived reliability of the information and the general trust in the government.

Based on the correlation outputs, we had reasons to assume that the importance of governmental communication in the context of terrorism is not to be underestimated. We wanted to explore and validate potential relationships between the concepts of risk communication and risk regulation. We assumed that effective governmental risk communication can raise the levels of trust in the government as a risk regulator. We tested some structural equation models in AMOS. The models provided us with statistical evidence that the better people perceive the government as a good risk communicator, the better the government will be perceived as a risk regulator. This evidence can be used to convince governments to put more efforts in creating efficient communication strategies that increase the public's satisfaction with the amount, quality and reliability of the provided information. The gain of trust in the government as a risk communicator will result in an increase of trust in the government as a risk regulator, perceived to be able to prevent terrorist attacks. Besides this increase in trust, citizens will also be less critical about the statement that there is no room for bottom-up communication. Moreover, citizens will feel less need to communicate with the government about terrorism, probably because they are confident in the fact that the government controls the risk. However, the opinion leaders are a special group of people that extensively search information about terrorism, talk about the topic to others and perceive themselves as opinion influencers. The results show us that this group of people will need to communicate for example to exchange knowledge. Governments should take initiatives to create communication platforms to provide enough, qualitative and reliable information to citizens. We also assume that especially the opinion leaders will normally quite rapidly seek access to these platforms to satisfy their need for risk information. The outcomes of the multivariate analyses have provided an answer to the third research objective.

To conclude, we want to propose some general recommendations. Governmental institutions must be aware of the fact that communicating about terrorism as a risk is very delicate as they will have to find the balance between raising the communal resilience and preparedness levels and inducing a culture of fear. Chapter one already discussed this issue

extensively. As the data revealed, even though terrorism is perceived as a threat that is relatively nearby and the risk perception levels are relatively high, the percentage of people that is actually looking for information about terrorism is low, as for the percentage of people that have high fear levels and behavioural intentions. This means that the majority of the population is not really concerned (yet) about the risk. Of course, fortunately, we have never been directly confronted with terrorist attacks as they occurred in New York, Madrid or London. We assume that the risk of terrorism is especially medially and socially constructed. It is brought into the hearts and minds of the Flemish population, but we can assume that it is rather perceived as a media reality than a proximate and personal threat. However, we are convinced that governments need to construct and implement specific risk communication programs about terrorism for the following reason. A substantial portion of the population has a specific profile that is characterized by raised information seeking levels (active and event triggered seeking and passive information scanning), social behaviour (talking to others about terrorism) and a specific opinion leadership trait. We call them opinion leaders. This group of people is the primary target group in risk communication programs. They are especially characterized by their higher information need and their need to participate in the risk communication and management strategies. Practically, governments can create communication platforms that are suited for a two way information and communication flow. Websites, forums and hotlines are channels that are very well suited for this. As for the type of information, it is important to take into consideration the objectives of the institutions on the one hand (providing practical information, guidelines etc.) and the specific risk information needs of the target groups on the other hand (general, explicative and reliable information about terrorism).

RESEARCH REPORT II

THE BIRD FLU OR H5N1

1. Introduction to the topic: the mortal threat of the bird flu or H5N1

The H5N1 virus, Avian Influenza or so called bird flu virus is a very contagious and mortal viral disease that arises with poultry. The first known direct avian to human transmission of the H5N1 virus was discovered and reported during an outbreak in Hong Kong in 1997 (Di Giuseppe, Abbate, Albano, Marinelli, & Angelillo, 2008). As mentioned by the World Health Organization, there are several public health interventions required for effective disease prevention and control of the multi faceted issues posed by avian influenza (WHO, 2006). The creation and implementation of effective communication plans to keep the population fully and adequately informed is absolutely necessary. Di Giuseppe et al. mention that, in the past years, only a very limited number of studies have been published that scrutinized knowledge, attitudes and practice about avian influenza among specific target groups and the general population (Abbate, Di Giuseppe, Marinelli, & Angelillo, 2006; Fielding et al., 2005; Lau, Kim, Tsui, & Griffiths, 2007). Di Giuseppe et al. performed a study about the knowledge, attitudes and practices towards avian influenza with the Italian population. The data of their large scaled survey study revealed that the respondents had no detailed understanding and knowledge about the virus, they had a great perceived risk of experiencing the disease and had a low compliance with precautions behaviour.

Based on their research, Di Giuseppe et al. conclude by stating that the design and implementation of avian influenza educational programs and measuring their effectiveness should be priorities to incentive the population to take a more active role.

The probability of an outbreak of the virus in Belgian was communicated as relatively high. On the other hand, civilians were also advised to take safety measures e.g. by avoiding direct contact with poultry and live up to strict hygienic measures. The media coverage of the bird flu was periodical but rather intensive. People were confronted with the risk through the mass media. However, the information that was spread tried to induce the feeling that the virus could be avoided by personal protective actions such as the protective safety measures that were mentioned above. The risk was more transparent than for example the risk of terrorism.

In august 2005, when there was a new outbreak of avian influenza virus in South-East Asia and the virus appeared for the first time in Siberia, the Belgian Federal Agency for Food Safety started a communication policy that was formulated by themselves as ‘proactive, objective and free of sensationalism’. Besides the information campaign for the poultry breeding industry, the agency launched a large scaled national media campaign on 1st March

2006. In this campaign, information about the obligatory safety measure of screening all poultry (industry as well as civilians) was diffused as well so that people would know what to do. The agency created brochures and TV - and radio infomercials that targeted various target groups (industry, adults and children). All of the information was diffused through the website of the Agency, the mass media and a special hotline. As the agency stated in their press release on 2nd February 2006, 'the participation of the responsible spokesmen of the agency to public debates and lectures contributed to the diffusion of realistic, to the point and scientifically based information that also included references to the Belgian and European legislation'.

The information campaign injected the necessary risk information about the bird flu and the concrete protective guidelines into the community by means of several media and especially the usage of experts that participated in news debates, interviews etc.

As we already performed some large scaled quantitative survey studies in the context of terrorism, and they idea of creating a risk perception and communication monitor had already arisen from the results of these studies, it seemed like a good idea to perform a quantitative survey in the context of the bird flu as well as it is one of our primary amis to validate the methodology in various risk contexts. We set up very similar research objectives in this new context, involving a more tangible risk.

2. Objectives of the studies

This research study focuses on the concepts of risk perception, risk information seeking, behaviour and trust in the government as a risk regulator and risk communicator in the context of the bird flu. It actually builds upon the previous studies, but it incorporates some additional concepts. We will now summarize the main objectives of this study:

1. Confirmation of the measurement scales (validation and reliability analyses) and the methodology in a new risk context.
2. Delivering a full and comprehensive descriptive report on the statistical descriptives of the central concepts in our risk management strategies, including risk perception, mental distance, fear levels, specific behavioural intentions, information seeking behaviour and trust in the government.
3. Confirmation of the information seekers segmentation and validation of the tool to identify opinion leaders in this new and different risk context.
4. Developing concrete communication guidelines and a concise risk communication strategy in the specific context of the bird flu.

So the key objectives are comparable to the objectives of the first study in the context of terrorism. However, we added additional items concerning source reliability and information channel usage in order to create a more specific and detailed risk communication strategy.

3. Sampling procedure and sample descriptive statistics

In total, 36 students each had to select 9 respondents according to our selection criteria: 18 students had to select 4 male and 5 female respondents, 18 students selected 5 male and 4 female respondents, three respondents from each category of age, starting from the age of 18 as minors are less relevant in our studies. The age categories were as follows: 18-34 years, 35-54 years, and 54 years. Eventually, questionnaires were distributed in the period of April 2006. From this sample, 320 surveys could be used for analysis after the data cleaning. The sample is a convenience sample (quota sample) and the distribution of age and gender are comparable to the distribution in the Flemish population, except for a slight overrepresentation of the respondents in the age category of 20-64 years and an very slight underrepresentation of the respondents older than 65 years. As the maximum difference was 6%, we did not weigh the data for these categories. However, as the sample size is restricted to 320 respondents, it is important to take into consideration that the descriptive statistics give a clear indication but should be interpreted with care.

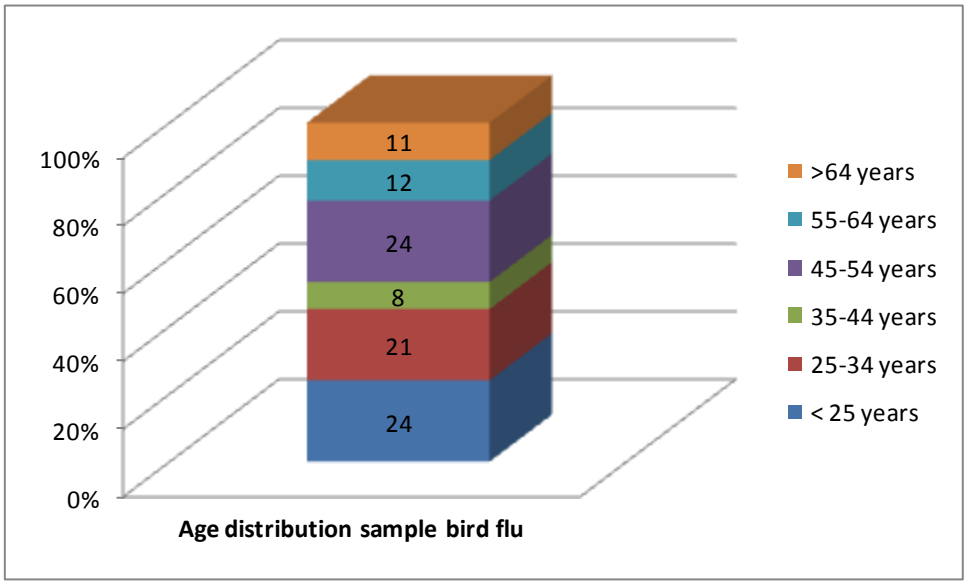


Figure 43: Age distribution sample bird flu

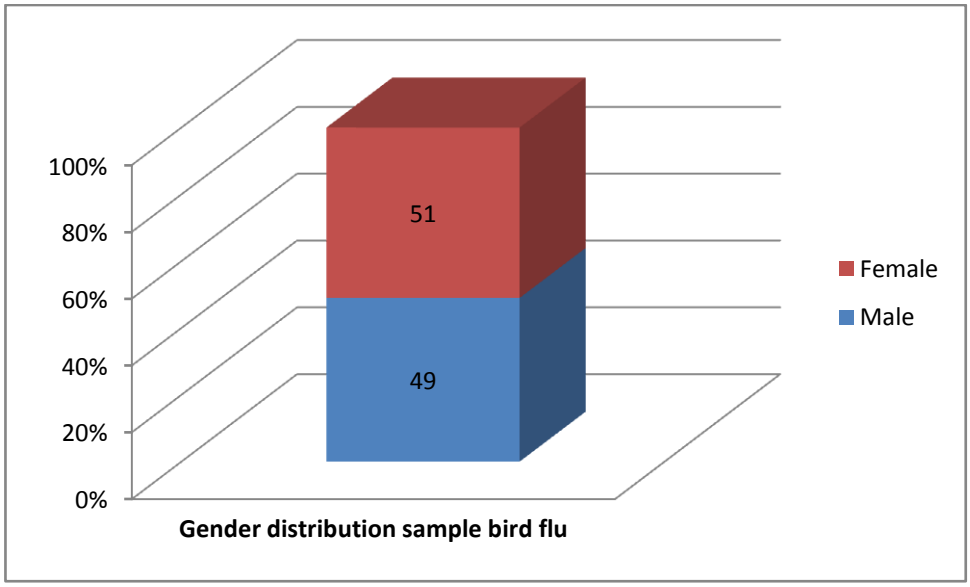


Figure 44: Gender distribution sample bird flu

Bird flu				
Age category	**Male**		**Female**	
	Flanders	**Sample**	**Flanders**	**Sample**
20-64	**39%**	**44%**	**38%**	**44%**
≥65	**10%**	**4%**	**13%**	**7%**
$N_{Flanders}$ =6043161 N_{sample} =320				

Table 69: Comparisons sample and population percentages sample bird flu

We can see that the largest difference between the sample en the population is 6% (underrepresentation males and females >65 yrs in sample). We decided not to weigh this subsample as the differences are minimal.

4. The concepts

As the nature of the risk of bird flu is quite different than the threat of terrorism, we had to customize our items to the specific traits in the operationalization phase. However, the concepts that were scrutinized were similar to the concepts in the other survey studies as our key objectives were similar as well. We did add some specific questions that relate to the specific behaviour of people in the context of the bird flu as the resulting descriptive statistics could be of great value to estimate risk perceptions and concrete behaviour. We will now present an overview of the key concepts and the internal consistency of their items. The items that are included were all statements that were measured on 6 point Likert scales (mostly varying from totally don't agree to totally agree).

Construct	N	Items	α
Risk perception	**5**	How large do you estimate the probability that there will be an outbreak of the bird flu in Belgium? How large do you estimate the probability that a variant of the virus that can be transferred between humans will spread in Belgium? How large do you estimate the probability that you will get infected with the harmful variant of the bird flu virus? I estimate that there is a high probability that there will be an outbreak of the bird flu virus in Belgium Since the confirmed outbreaks of the bird flu with animals in our neighbor countries, fear for a possible outbreak in our country has increased	**0.84**
Mental distance	**3**	I do not worry about a possible outbreak of the bird flu because the virus has only affected other countries An outbreak of the bird flu is something that takes place abroad De variant of the bird flu virus that is harmful for humans will only affect countries where people have a lot of contact with birds	**0.68**
Fear	**2**	When I am using the public transportation I will try to avoid coughing people When I am in a public place, I sometimes realize that I could easily be contaminated with the bird flu virus **r=0.61*****	
Behaviour	**2**	I have tried to image how I would react when there would be an outbreak of the bird flu in Belgium Do you think about taking measures to prepare yourself for a possible outbreak of the bird flu in Belgium? **r=0.53*****	
Information need	**3**	I feel the need to communicate with the government about the threat of the bird flu I feel the need for immediate and reliable information about the bird flu virus (0800 hotline, website…) I think it is important to be informed about the things that happen in the context of the bird flu	**0.70**
Information seeking	**5**		**0.88**
Active info seeking	1	I explicitly look for information about the bird flu in the media	
Event triggered info seeking	1	When there is new info about the bird flu, I will look for more information as quickly as possible	
Passive info scanning	*3*	When there is an item about the bird flu the news, I will follow this item with more attention I will never skip articles or information about the bird flu in newspapers When the tv or radio is on and there is some news about the bird flu, I will follow it with more attention than the other items that are mentioned	*0.87*
Talking to others	**6**	When there has been a TV-program or item about the bird flu, it will be discussed in my personal/social environment I think it's important to have the possibility to talk to friends/family/colleagues… about the bird flu When there is a news items about the bird flu, I will discuss it with others How often do you talk about the bird flu to the following (groups of) persons	**0.88**

	Familiy/friends/colleagues or fellow students (3 items, measured on six point scales)

Table 70: Factor analysis (PCA with Varimax rotation) for key constructs in context of the bird flu

The cronbach's alpha's vary from 0.68 (mental distance) to 0.88 (information seeking, social behaviour) so they all exceed the crucial value of 0.65. We can conclude that the scales are internally consistent.

5. Comprehensive descriptive report

As in the first research report, we will first discuss all general descriptive statistics that will provide us with a clear overview of the key concepts of risk perception in the context of the bird flu. When interpreting the figures, we must bear in mind that the simple size was limited (n=320), so the results are indicative. Let us first take a look at key the risk perception constructs: risk perception, mental distance, fear, behaviour (intentions), information needs, information seeking behaviour, information saturation and social behaviour.

5.1. Risk perception

Again, we included the means and standard deviations as well as the percentages of people with low and high scores. The figures should be interpreted on a scale from 1 to 6, as the concepts were constructed with items that were measured on 6 point Likert scales.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Risk perception	3.41	0.89			29	5
Mental distance	2.86	0.79		<35 year = 2.84 35-44 year = 2.51 45-64 year = 2.85 >64 year = 3.26 *F(3,311)=4.74***	44	1
Fear	2.77	1.18		<35 year = 2.37 35-44 year = 3.17 45-64 year = 2.91 >64 year = 3.71 *F(3,311)=16.42****	48	6
Behaviour	2.39	1.01			65	1
Information need	3.37	0.96	Male = 3.24 Female = 3.49 *t (318)=-2.32**	<35 year = 3.12 35-44 year = 3.75 45-64 year = 3.50 >64 year = 3.69 *F(3,313)=6.76****	32	6

Information seeking	3.15	0.97	Male = 3.03 Female = 3.49 *t (313)=-2.15**	<35 year = 2.84 35-44 year = 3.53 45-64 year = 3.27. >64 year = 3.81 *F(3,308)=13.47****	37	4
Info saturation	2.74	1.08			41	6
Talking to others	2.73	0.84	Male = 2.63 Female = 2.84 *t (309)=-2.23**		58	7
Significance key	* p≤0.05	** p≤0.01	*** p≤0.001			

Table 71: Descriptive statistics key constructs in the context of the bird flu

The risk perception level is above average (mean = 3.41) and the perceived distance towards the threat is below average (mental distance mean = 2.86). When we take a look at the concrete percentages, only 5% of the respondents has high risk perception levels and 44% has low mental distance levels. The fear level is below average (mean = 2.77) and only 6% of the respondents have a high fear level while 48% is not afraid that the bird flu will affect them. These figures indicate that the risk is perceived as a threat that is present in one's close environment, but that it is not perceived as something that will happen to the respondents personally. On the other hand, we see that 46% to 66% answers neutrally and does not have really outspoken opinions about the bird flu. This might be a sign that there is a lack of interest, or a lack of knowledge about the risk.

When we take a look at the concrete behaviour of people, we notice that only 1% has already thought about concrete protective actions (mean = 2.39). For information seeking behaviour, the mean is above the average (3.15) as well as the need for information (mean = 3.37), but the percentages illustrate more outspoken results: only 4% of the respondents seeks information (combination of active, passive and event triggered information seeking) about the bird flu and 6% states to have a high need for risk information. Again, we discover that a large part of the respondents answer neutrally: 63% to 68% has scores between 3 and 4 on the 6 point scale. So the relatively moderate answering patterns indicate that the general public is not really involved in the matter.

For social behaviour, the mean is below average as well (2.73) and only 7% states that they talk to others about the bird flu (construct with 6 items) while 58% declares that they have a low social interaction in the context of the bird flu.

5.2. Gender and age differences

We have only found gender differences with regard to the information seeking behaviour. In general, women have significantly higher means for information seeking, information need and social behaviour, indicating that they might be more involved with the matter than men. They do not differ in terms of risk perception and fear.

Concerning the age groups, we found more significant differences. The youngest age category (<35 years) has the lowest level of fear, information need and information seeking,

indicating that they are not as involved. The oldest age category (>64 years) has the highest fear level, high information needs and high information seeking behaviour, on the other hand, their mental distance is the highest, indicating that they perceive the risk as being more remote. The category of 35-44 years has the lowest mental distance, the highest need for information and the highest information seeking level. We assume that the opinion leaders will be identified within this age group.
We were intrigued we the results concerning the risk perception levels, so we decided to analyze the concept of risk perception somewhat more into depth.

5.3. Specific risk perception and protective behaviour

We asked the respondents to indicate the probability of three events on a 7 point Likert scale, ranging from 'that will certainly never happen' to 'that will certainly happen': the probability that the virus will spread in Belgium, the probability that there will be a variant of the virus in Belgium that can be spread between humans and the probability that they will be infected with the harmful variant of the bird flu virus. We recoded the 1, 2 and 3 (will certainly take place, there is a minimal chance, the chance is small) on the 7 point scale into 'low' perceived probability level, 4 remained the 'moderate' probability level and 5, 6 and 7 (there is a considerable chance, there is a large chance, this will certainly happen) to high perceived probability level.

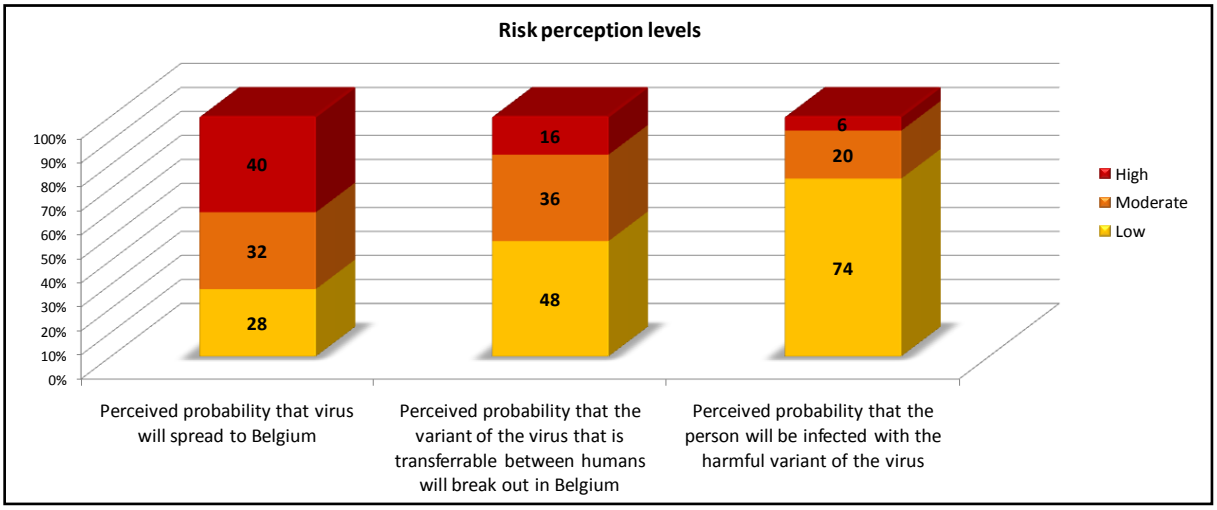


Figure 45: Specific risk perception levels I nthe context of the bird flu

As the bar charts indicate in the graph above, the perceived probability levels are rather high but decrease as the threat is positioned in the near proximity of the respondents. We ascertain that 40% of the people thinks that there is a high probability that the bird flu virus will be spread in Belgium. This percentage decreases to 16% when we ask to indicate the probability level of the outbreak of the variant that is harmful for human beings and

eventually only 6% of the respondents thinks that they will be infected with the virus. So we can clearly see that the bird fu as a threat is a perceived risk that is near, but will not affect the person himself. This is what is called the 'personal invulnerability' bias and especially the 'denial' bias (Thompson, 1985). These psychological defense mechanisms allow human beings not to be preoccupied with the evaluation of personal risk, which would only induce increased levels of chronic anxiety and stress (Handmer & Penning-Rowsell, 1990).

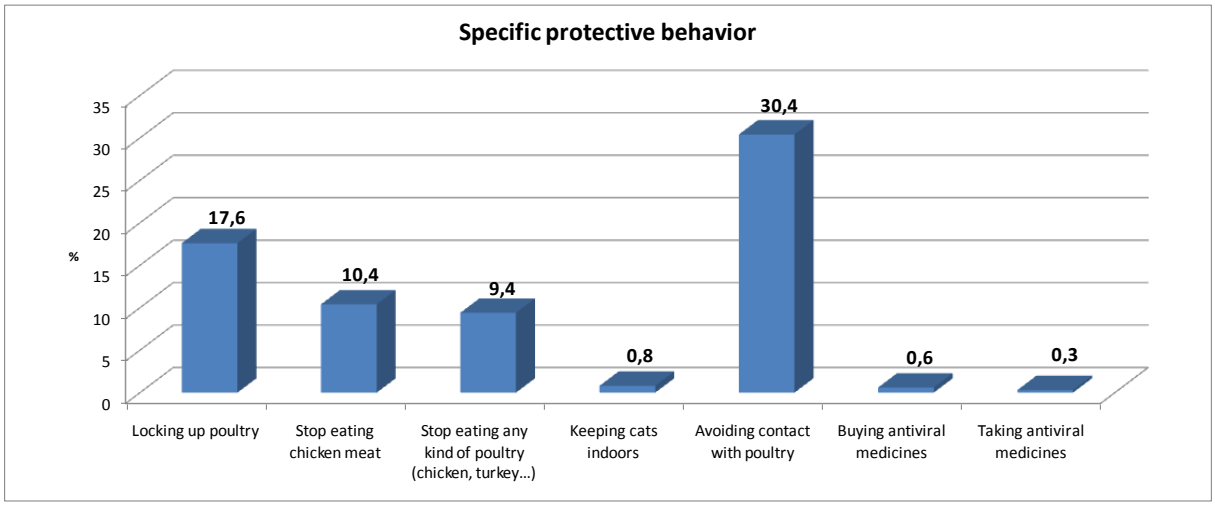


Figure 46: Specific protective behaviour in the context of the bird flu

When we take a look at the concrete protective behaviour of the respondents, we can see that, even though some protective actions were obligatory (locking up poultry), the percentages of people who really implemented these preventive actions are rather low: less than 1% has bought or taken antiviral medicine and keeps their cats indoors. About 10% has stopped eating poultry, 18% has locked up their poultry (of course, there is a bias because not all people own poultry and we did enter a selection variable that allowed us to determine the percentage of people who own poultry) and 30% has avoided contact with poultry. Besides concrete behaviour, we were especially interested in the information seeking behaviour.

5.4. Information seeking behaviour

The items that the constructs are based upon were measured on 6 point Likert scales so the means should be interpreted on a continuous scale from 1 to 6. The 'low' percentages are the sum of the percentages of the 1 to 2 interval and the high percentages are the sum of the 5 to 6 interval.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Active info seeking	2.52	1.10		<35 year = 2.22 35-44 year = 2.88 45-64 year = 2.69 >64 year = 2.89 *F(3,313)=6.86****	49	6
Event triggered info seeking	2.52	1.08		<35 year = 2.16 35-44 year = 3.04 45-64 year = 2.66 >64 year = 3.09 *F(3,313)=12.24****	50	4
Passive info scanning	3.58	1.12		<35 year = 3.27 35-44 year = 3.91 45-64 year = 3.66 >64 year = 4.36 *F(3,308)=11.14****	24	15
Significance key: *** p≤0.05 ** p≤0.01 *** p≤0.001**						

Table 72: Information seeking behaviour descriptive statistics in the context of the bird flu

The percentages of active and event triggered information seeking are very low (respectively 6% and 4% of the people have high scores) and the means are below average (2.52 on 6 point scale). For passive information scanning, the mean is higher (3.58) and 15% scores high on this construct.

Again, there is a large portion of the respondents that answers rather neutrally (3 or 4 on 6 point scale): it varies from 54% to 61%. We found clear differences between age groups: the youngest age category (<35 years) scores significantly lower. We assume that this group is less involved and less worried about the risk. The oldest age category has the highest scores on all three types of information seeking.

6. Identifying and profiling the public

The second central research objective, the classification and profilation of risk information seekers, was also scrutinized in the context of the bird flu. We will perform a cluster analysis for the primary confirmation, and validate the exposed groups with a discriminant analysis.

6.1. Identification of opinion leaders

Based on the preceding results in report I in the context of terrorism, we decided to use the same central concepts to validate the information seekers classification as exposed in the previous studies. So three main traits were used as a foundation for the cluster analysis and the identification of the opinion leaders:

1 Information seeking behaviour, split up in active information seeking, event-triggered information seeking and passive information scanning. Again, we wanted to differentiate in the information seeking behaviour as we assumed that the specific information seeking behaviours (active, event-triggered and passive) might separately be determining variables that distinguish one group from another. So we will integrate the three concepts separately.

2 Social behaviour, expressed in the frequency of talking to others about the involved risk context

3 Specific opinion leadership traits. In the first surveys that we conducted, this trait was measured by means of one specific item

"In conversations, my friends, colleagues, family… attach much importance to my opinion concerning the bird flu."

6.2. Cluster analysis

The first research report empirically confirmed the classification of four groups of risk information seekers in four studies. We will therefore use the basic assumption of four groups in this analysis as well. Also the five main concepts, as mentioned above, were used in the cluster analysis. Again, we used the k-means cluster analysis technique because we have predefined the clustering variables. Missing data were deleted casewise.
First, we will graphically describe the four clusters that were retrieved.

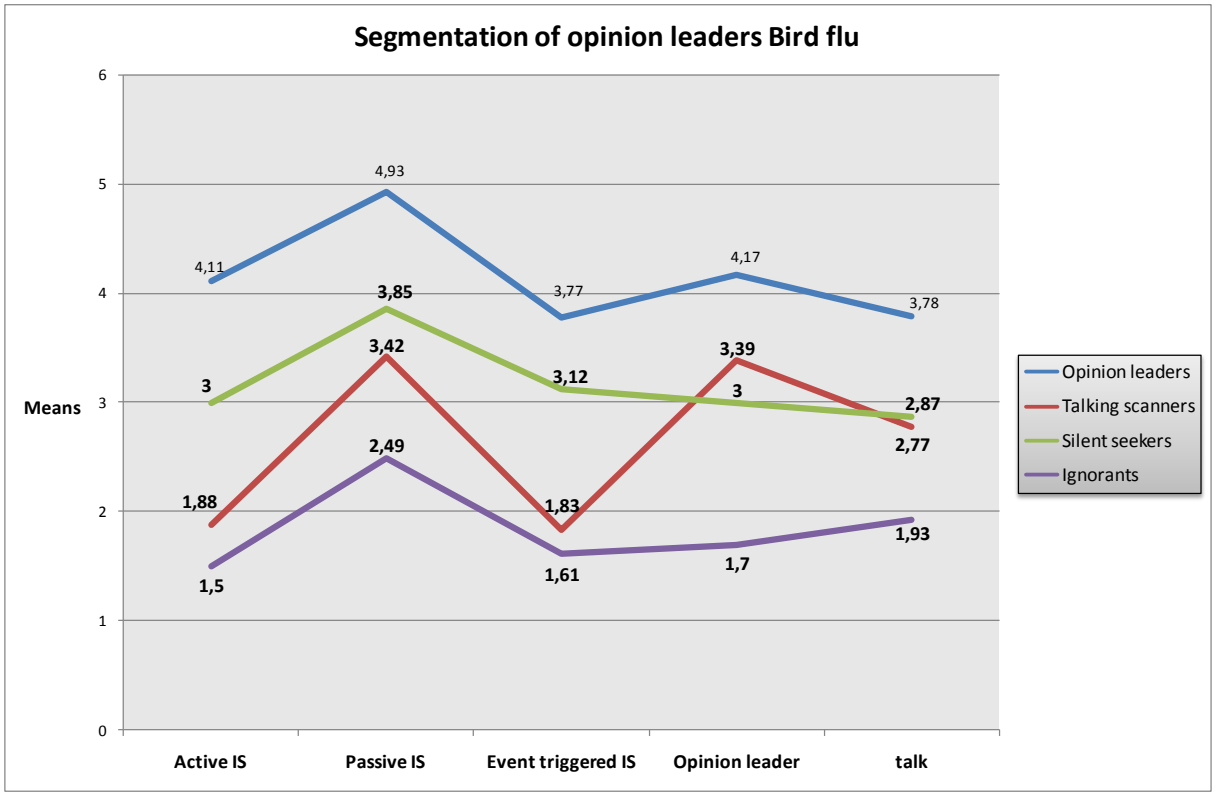


Figure 47: Segmentation of information seekers in the context of the bird flu

Segment	%
Opinion leaders	15
Silent seekers	25
Talking scanners	33
Ignorants	26

Table 73: Overview of the presence of each cluster of information seekers in the context of the bird flu

The four group solution was retrieved again.

1. **Opinion leaders.** This is the group of respondents who have the highest scores on all cluster variables. Their information seeking behaviour is high (active, passive and event triggered search), they consider themselves as opinion leaders and they talk more about terrorism to other people than the other groups. This is the most important group of people as this will also be our primary target group in our risk communication programs since the diffused information will reach them more accurately and they will talk to other people about the risk of terrorism. The percentage of opinion leaders is 15%, somewhat lower than in the context of terrorism (varied from 21% to 25%).
2. The second group is the group of **silent seekers.** Their active information seeking behaviour is moderate, but their event triggered and especially their passive information search is above average. However, they only score averagely on social behaviour and they even score rather low on the opinion leadership (perceived influence) trait. The data revealed that 25% of the respondents are silent seekers. This group does not play a very important role as a target group for communication efforts as they will not spread the information that they retrieve. Their active information seeking behaviour is not high either so they will not come to the information that would be deliberately spread by the governmental institutions.
3. The third group is the group of **talking scanners.** This group is characterized by its rather high passive information search behaviour, but low active and event triggered information search. They have moderate scores on social behaviour but higher scores on opinion leadership in terms of perceived influence. The only difference with the four group classification in the terrorism context is that talking scanners and silent seekers have the same (statistically non-significant difference of 0.1) score on the social behaviour construct, whereas in the terrorism context, the difference in social behaviour was more outspoken. This group may be of importance to risk communicators as they do talk about terrorism and they perceive themselves as opinion leaders, but they do not look for specific (and correct) information actively. It may be important to discover their media profiles so that they could be reached if very crucial information would have to be disseminated in the community (e.g. guidelines). This group could be a secondary target group in the risk communication strategy.
4. The last group is the group of **ignorants**. These people generally score low on all variables. They are not interested in the bird flu, they do not talk about it and do not consider themselves as opinion leaders. They are no primary and even no secondary

target group as they do not look for or retrieve information about terrorism neither do they talk about the subject. The percentage of respondents in this category is 26%.

6.2.1. Additional analyses

The output of the analysis of variance shows that the F values are high and statistically significant for all cluster variables (p values are all 0.000). This indicates that the means differ significantly on these variables.

	Analysis of Variance Bird flu					
Variable	Between SS	df	Within SS	df	F	signif. p
actiefinfo	256,0806	3	112,4161	302	229,3157	0,000000
infozoek	211,6935	3	136,8065	302	155,7710	0,000000
opinionl	210,0703	3	175,7500	302	120,3247	0,000000
passinf	189,6532	3	187,5305	302	101,8062	0,000000
talk	105,6347	3	105,3497	302	100,9390	0,000000

Table 74: Analysis of variance (cluster analysis) in the context of the bird flu

The Euclidean distances (E.D.) and squared Euclidean distances (E.D.²) are all high. These distances are computed from the cluster means on each dimension. The two groups that differ the most are opinion leaders and ignorants (E.D.=2.32, E.D.²=5.38). The two groups that differ the least from each other are, as presumed, the silent seekers and the talking scanners (E.D.=0.81, E.D.²=0.65).

	Euclidean Distances between Clusters Bird flu Distances below diagonal Squared distances above diagonal			
Cluster Number	No. 1	No. 2	No. 3	No. 4
Silent seekers	0,000000	0,998524	1,791107	0,650411
Opinion leaders	0,999262	0,000000	5,381473	2,517624
Ignorants	1,338322	2,319800	0,000000	0,925227
Talking scanners	0,806481	1,586702	0,961887	0,000000

Table 75: Euclidean distances cluster analysis in the context of the bird flu

The next step in the validation of our four group solution is a discriminant analysis.

6.3. Discriminant analysis

6.3.1. Assessing the overall fit of the proposed model

Wilks' Lambda is **0.10**; F (15.82)= 69.82 (p<0.000), so the low Wilks' Lambda proves that the between-groups dispersion is large compared to the within groups dispersion. The four groups differ significantly and the six independent variables are discriminant items.

The **Wilks' Lambda's** which are mentioned in the first column of the output, refer to the Wilks' Lambda for the overall model that will result after removing the respective variable. None of the Wilks' lambda's exceed 0.154. So each one of the independent variables contribute to the discrimination.

The **Partial Lamda's** in the second column are associated with the unique contribution of the respective variable to the discriminatory power of the model. The value (that ranges from 0 to1) has to be as low as possible. We can read that the partial lambda's range from 0.67 to 0.94.

The **F-remove** values are associated with the respective partial Wilk's Lambda's and the **p-levels** indicate the significance levels of the F values. All F values are significant as the p-levels are all far lower than 0.001.

The **Tolerance** values are in fact the results of 1-r^2 of the respective variable with all other variables in the model as shown in the output. It is a measure of the redundancy of the respective variable. Naturally, 1-Tolerance is the r^2 of the respective variable with all other variables in the model/output. The miminum r^2 (0.07) is the one of the variable **passive information retrieval** and **social behaviour** (talk). Their Tolerance values are 0.93, which means that the variables passive IS and **talk** are 7% redundant with the other variables. The highest r^2 is 0.12 (Tolerance=0.88), which means that 12% of the variable **event triggered information seeking** is explained by the other five variables in the model.

	Discriminant Function Analysis Summary (survey vogelgriep cluster.sta) No. of vars in model: 5; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,10372 approx. F (15,823)=69,819 p<0,0000					
N=306	Wilks' Lambda	Partial Lambda	F-remove (3,298)	p-level	Toler.	1-Toler. (R-Sqr.)
active IS	0,138979	0,746321	33,76398	0,000000	0,889611	0,110389
event triggered IS	0,122232	0,848568	17,72667	0,000000	0,875871	0,124130
opinion leader	0,154034	0,673375	48,18232	0,000000	0,907327	0,092673
passive IS	0,124316	0,834347	19,72184	0,000000	0,930851	0,069149
talk	0,110338	0,940046	6,33525	0,000354	0,926639	0,073361

Table 76: Discriminant function analysis summary in the context of the bird flu

To summarize, the variable with the highest discriminatory power is opinion leadership (Wilks' Lambda = 0.14, partial lambda = 0.67), followed by active information seeking, passive information seeking and event triggered information seeking (the latter two are equally discriminating). The least discriminating variable is social behaviour (talk) because it has the lowest Wilks' lambda (however 0.11 is still higher that the general Wilks' lambda value of the model of 0.10) and the highest partial lambda (0.94) but still, the F value is statistically significant.

6.3.2. Assessing groups membership prediction accuracy

The **classification matrix** contains information about the number and percent of correctly classified cases in each group. The subjoined classification matrix shows us that more than 96% of the cases are correctly assigned to the predicted groups. For the most important group in our research, the opinion leaders, this percentage is 87%, which is rather low, but this is probably due to the smaller sample size which leads to the fact that within the group of opinion leaders, there are only 47 respondents (from which 41 are classified by the discriminant analysis as opinion leaders).

	Classification Matrix Bird flu Rows: Observed classifications Columns: Predicted classifications				
Group	Percent Correct	Silent seekers p=,33333	Opinion leaders p=,15359	Ignorants p=,26144	Talking scanners p=,25163
Silent seekers	100,0000	102	0	0	0
Opinion leaders	87,2340	6	41	0	0
Ignorants	98,7500	0	0	79	1
Talking scanners	93,5065	5	0	0	72
Total	96,0784	113	41	79	73

Table 77: Classification matrix discriminant analysis in the context of the bird flu

6.4. Profiling opinion leaders

In this section, we will first describe the socio-demographical profile of the opinion leaders and the other information seekers, followed by the specific media profiles. The description of the profiles of these groups is crucial in the construction process of a public oriented risk and crisis communication program. As mentioned previously, the most crucial target group to reach with risk communication efforts are the opinion leaders as these people look for risk information, they talk to others more than other people and they have some general opinion leadership traits (convincers, leaders, valuable sources of information).

Socio-demographical profile

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Gender	**45% male**	51% male	43% male	58% male
	55% female	49% female	57% female	42% female
Age (mean)	**47.81**	36.53	43.79	36.20
	F(3,300)=7.65, p<0.000			
Educational level	30% low	14% low	15% low	10% low
	28% average	22% average	35% average	38% average
	43% high	64% high	51% high	53% high
	X^2=14.10, p=0.023 (0% Fe<5, min.Fe=7.40)			

Table 78: Socio demographical profile of information seekers in the context of the bird flu

Opinion leaders are mainly female, but the difference is not very outspoken (45% men versus 55% women). The mean for age is almost 48 years old, which is rather high compared to the other groups. The respondents in the opinion leadership group are rather highly educated. The talking scanners are younger (mean = 36 years) and equally distributed for gender and silent seekers are mainly female with an average age of 44. The ignorants are mainly male (58%) and include the youngest people (mean age = 36 years). The perception profiles will provide us with a more detailed view on status of the general concepts that surround risk perception in the context of the bird flu.

Perception profiles

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Risk perception	**3.85**	3.20	3.52	3.21
	*F(3,297)=7.55****			
Mental distance	**2.76**	2.82	2.83	2.91
	n.s.			
Fear	**3.55**	2.37	2.95	2.45
	*F(3,300)=13.89****			
Behaviour	**3.45**	2.31	2.55	1.71
	*F(3,295)=39.58****			
Need for information	**4.34**	3.11	3.74	2.57
	*F(3,302)=69.70****			
Information saturation	**3.57**	2.53	2.89	2.3
	*F(3,302)=18.24****			

Table 79: Perception profiles of the information seekers in the context of the bird flu

The data revealed significant differences for all constructs, except for mental distance. The opinion leaders have the highest means on all constructs. They are most worried about the bird flu as a threat and they are the only group that has a fear level that is above the average of 3 on the six point scale (3.55). Same accounts for their behaviour level (3.45). We would like to stress their high need for risk information (mean score of 4.34). These results indicate that our most important target group, the opinion leaders, are most worried about the risk of bird flu and that they have a high need for risk communication. That is why we will now take a look at the specific media consumption patterns for both the opinion leaders versus the non opinion leaders (sum of the talking scanners, silent seekers and ignorants).

Media profiles of target groups (opinion leaders)

General media consumption

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Television		n.s.		
Internet		n.s.		

Table 80: Media profiles of the opinion leaders in the context of the bird flu

There were no significant differences in general television and internet consumption.

Specific media profiles

The following bar chart represents the specific media usage of opinion leaders and non-leaders. The bars represent the percentage of respondents who look for information about the bird flu in the specific media (sum of categories weekly, several times a week and daily). We can conclude from the chart that the percentage of people that often look for information about the bird flu is generally much higher for opinion leaders than for non-leaders. The media that are most consulted are newspapers (62% of opinion leaders and 23% non leaders), followed by tv (50% and 23%) and radio (48% and 21%) in general. Magazines (39% and 8%) and governmental communication efforts on public television (35% and 11%) and radio (26% and 11%) are moderately consulted. Almost 22% of the opinion leaders consult personal sources for information about the bird flu (versus 3% of the non opinion leaders). Surprisingly, the internet is one of the least consulted sources (15% and 0,4%). The specific governmental communication channels are the least popular (13% and 1% consult governmental brochures and folders and 7% and 0,4% consult the information hotline). Foreign media are not popular either (7% and 2%) probably because of the fact that the nature of the threat is very much bound to geographical boundaries. People will look for information about the threat in their specific personal and geographical environment; it will probably not really interest them how the risk is evolving abroad as much as it is evolving in Flanders.

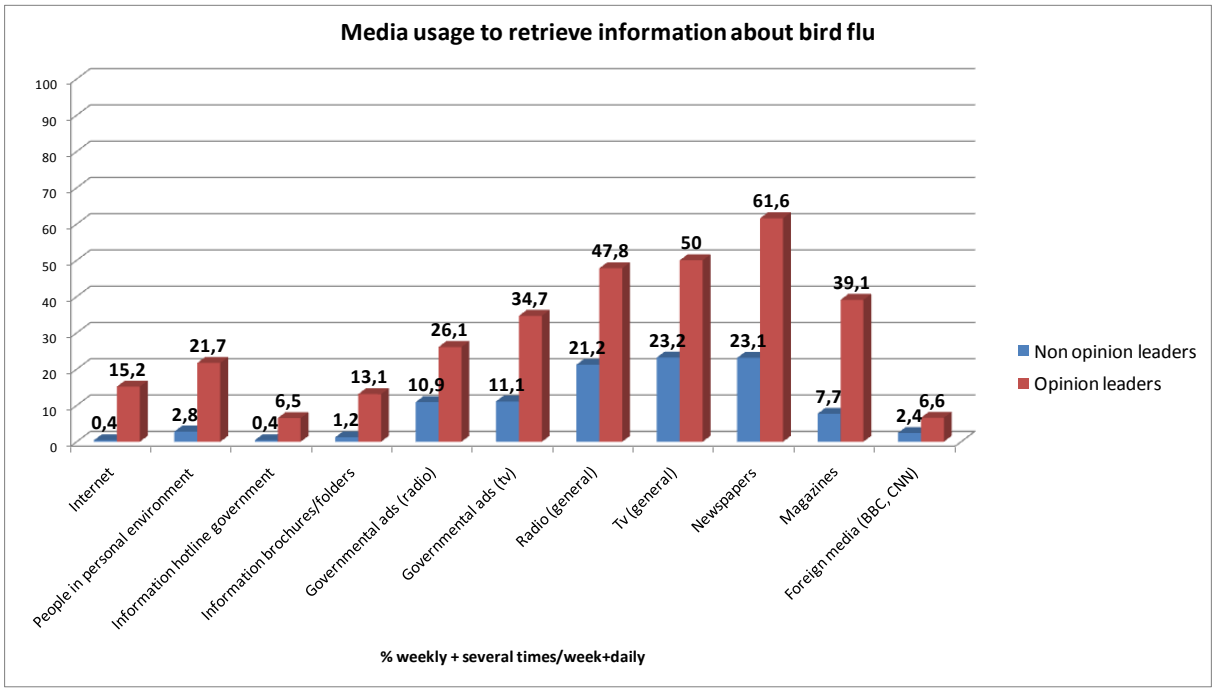


Figure 48: Specific media usage by opinion leaders and non leaders to retrieve information about the bird flu

As for the perceived reliability of the information sources, the subjoined bar chart represents the percentages of respondents (both opinion leaders as non leaders) that perceive the specific source as rather to totally reliable.

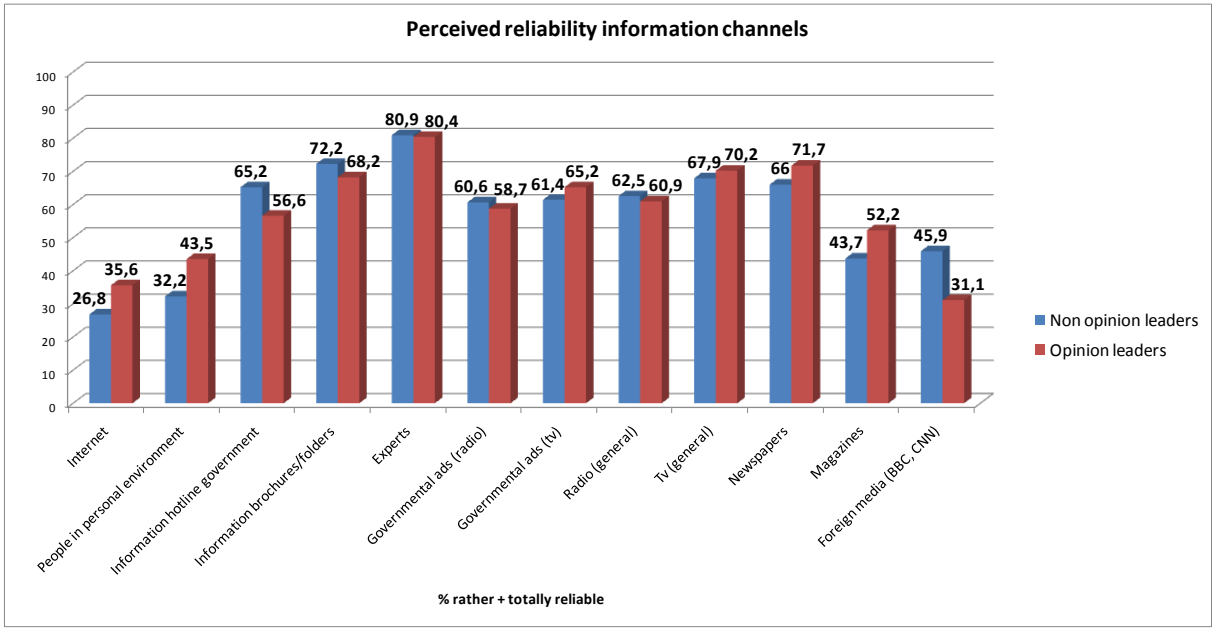


Figure 49: Perceived reliability of the information channels in the context of the bird flu

The sources that are most trusted are the experts: 80% of both opinion leaders as non leaders perceive 'the experts' as reliable sources. Information brochures and folders come in second place (68% and 72%), together with newspapers (72% and 66%) and tv (79% and 68%). Moderate percentages can be assigned to the information hotline (57% and 65%), radio (61% and 63%), governmental ads on tv (65% and 61%) and radio (59% and 61%) and finally magazines (52% and 44%). A lower percentage of people thinks that the following information channels are reliable: foreign media (31% and 46%), people in the personal environment (44% and 32%) and internet (36% and 27%).

There are a few somewhat contradictory results when we confront usage and reliability. Governmental communication channels are not consulted by a lot of people who look for information about the bird flu, but these channels are perceived as reliable by a large part of the respondents (57% to 72%). We can assume that this is simply because of the fact that the government is currently not communicating very intensively by means of these communication tools. As we will see in the next sections, only 30% to 35% of the respondents were satisfied with the quantity of governmental information about the bird flu. So fortunately, the governmental information and communication efforts are perceived as reliable (as we will also confirm by data analysis in the next sections).

Another contradiction lies within the result that 32% to 44% thinks that people in their personal environment are reliable sources for information about the bird flu but only 3% (non leaders) and 22% (leaders) consult personal contacts for information, while we are intensively promoting the communication strategy that uses opinion leaders as information leaders and agenda setters. We can counter this with the fact that experts are perceived as very reliable by the vast majority of the respondents (80%). We could assume that experts can be perceived as the vital sources of information for opinion leaders. The non leaders will perceive both experts in the media as people in their personal environments (whom they perceive as experts) as reliable sources to consult. We are also hypothetically assuming that, even though not many people perceive the internet as a reliable source, the governmental information that would be communication through various forums, official websites etc… will be consulted, especially by the opinion leaders, and will be perceived as reliable sources of information. We will now dig into the specific perceptions about governmental risk regulation and communication in the context of the bird flu (preparedness, reliability, quantity and quality of governmental information).

7. Governmental communication

7.1. Trust in institutes

We will first discuss the general trust in the governmental institutes on the four levels (European, national, provincial and local). The trust concepts is a reflection of the perceived preparedness of the governments on the four levels and we will also refer to it as the perception of the government as a risk regulator. The subjoined table includes both the means (and standard deviations) as the percentages of respondents that assign low (1 and 2) and high scores (4 and 5) on the 5 point Likert scales.

Degree of trust in following instances (5 point Likert scale)						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived preparedness European government						
Non-OL	3.60	0.73			9	66
OL	3.50	0.89			15	61
Perceived preparedness national government						
Non-OL	3.56	0.75			10	61
OL	3.39	0.99			20	54
Perceived preparedness provincial government						
Non-OL	3.11	0.92			24	32
OL	3.06	1.11			32	45
Perceived preparedness local government						
Non-OL	2.82	1.02			38	30
OL	2.87	1.30			38	39
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 81: Levels of trust in the various instances in the context of the bird flu

The perceived preparedness decreases with the level of the governmental instances. The European government has the highest mean (3.6 and 3.5 on the 5 point scale) and 61% (OL) and 66% (non OL) of the respondents assign high preparedness scores while only 15% (OL) and 9% (non OL) has little faith in the preparedness of the European government. We can draw parallel conclusions for the perceptions of the national government, the means are a little lower and so are the percentages of high scores (54% and 61%). The provincial government, responsible for the first in line crisis planning, is perceived as less prepared (means of 3.06 and 3.11 and only 45% of the opinion leaders and 32% of the non opinion leaders assign high scores) but the local government has got the lowest scores (means of about 2.8 and low percentages of high perceived preparedness). Remarkable is that the latter two have higher percentages of low perceived preparedness scores: 24% to 38% thinks that the national and local governments are not prepared on a crisis situation due to the bird flu. Besides the perception of the government as a risk regulator, we will now take a look at the specific perceptions about the government as a risk communicator, starting out with the levels of perceived reliability of the governmental information provided by the governmental institutes on the four levels. There were no significant differences for age or gender.

7.2. Reliability institutional information

Degree of trust in following instances						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Perceived reliability European info				<35 year =3.73 35-44 year = 3.72		
Non-OL	3.56	0.85		45-64 year = 3.34	12	61
OL	3.55	1.02		>64 year = 3.11 *F(3,313)=7.68****	17	57
Perceived reliability National info						
Non-OL	3.64	0.83			11	69
OL	3.68	0.91			13	70
Perceived reliability Provincial info						
Non-OL	3.43	0.81			11	50
OL	3.43	0.95			17	51
Perceived reliability Local info						
Non-OL	3.35	0.80			15	47
OL	3.40	0.99			15	47
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 82: Levels of perceived reliability of the governmental information about the bird flu

We can draw parallel conclusions for the perceived reliability of the governmental information coming from the institutes on the four levels. The national governmental information is perceived to be the most reliable (means of 3.64 and 3.68 and 70% of the respondents indicated that this information is reliable). The European information has very similar reliability levels: the means are both 3.5 and 57% (OL) and 61% (non OL) assigned high reliability scores. On this level, we found statistically significant differences for age groups: The youngest age category (<35 years) and the group of 35 to 44 years old have a significantly higher mean (3.73 and 3.72) than the other age categories. The seniors (> 64 years) have the lowest mean. The levels of reliability for the provincial and local governmental information are somewhat lower (means of 3.35 to 3.43) and so are the percentages of people that give high reliability scores (47% to 51%). In general, only 11% to 17% has assigned low reliability levels to the information coming from the four levels of governments (European, national, provincial and local). We can conclude that the reliability levels are rather high, exposing an opportunity for the governments to start with an initial image as a reliable information source. However, as we will empirically establish later on, the satisfaction with the quantity of information is low. We will now take a look at the specific needs in terms of concrete governmental protection measures and risk information.

7.3. Specific needs for measures and information type

We asked our respondents how important they perceive the following governmental (protective) measures. To what degree do they think that it is important that the government undertakes these measures? The statements had to be rated on 5 point Likert scales.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Vaccination of poultry			Male = 3.30 Female = 3.61			
Non-OL	3.45	1.07	*t (316)=-2.56**		17	53
OL	3.55	1.27			23	68
Locking up poultry of agricultural industry			Male = 3.83 Female = 4.09 *t (317)=-2.54**			
Non-OL	3.94	0.88			8	77
OL	4.26 *t (303)=-2.23**	0.97			6	89
Locking up all poultry (domestic and industrial)			Male = 3.39 Female = 3.77 *t (305)=-3.17***			
Non-OL	3.53	1.06			20	58
OL	4.00 *t (301)=-2.79**	1.07			11	78
Performing strict controls of the			Male = 3.82 Female = 4.13	<35 year =4.06 35-44 year = 4.52		

obligatory safety measures			*t (302)=-2.86***	45-64 year = 3.86 >64 year = 3.71		
Non-OL	3.93	0.98		*F(3,311)=4.32***	9	73
OL	4.28	0.99			6	87
	*t (302)=-2.20**					
To stock anti viral medicines for the human variant of the flu			Male = 4.37 Female = 4.57 *t (303)=-2.38**			
Non-OL	4.46	0.75			2	89
OL	4.66	0.60			0	98
	*t (303)=-2.04**					
Abandoning the import of poultry from high risk countries				<35 year =3.97 35-44 year = 4.36 45-64 year = 4.32 >64 year = 4.51		
Non-OL	4.12	0.92		*F(3,313)=5.45****	5	75
OL	4.49	0.83			6	92
	*t (304)=-2.58**					
Providing information to civilians about the dispersion of the bird flu virus			Male = 4.26 Female = 4.62 *t (299)=-4.57****		2	88
Non-OL	4.41	0.75			0	98
OL	4.66	0.52				
	*t (303)=-2.78***					
Providing information to civilians about how to prevent contamination with the virus			Male = 4.39 Female = 4.67 *t (299)=-3.41****			
Non-OL	4.51	0.74			2	92
OL	4.66	0.70			2	92
Providing information to civilians about the risks involved with the bird flu virus			Male = 4.26 Female = 4.61 *t (282)=-4.21****			
Non-OL	4.40	0.79			3	88
OL	4.66	0.60			0	94
	*t (304)=-2.57**					
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 83: Perceptions of specific needs for governmental initiatives and information types in the context of the bird flu

Almost all measures are perceived to be important. We can conclude this from the high means (most of them exceed 4 on the 5 point scale) and the high percentages of respondents who assign high importance levels to the measures. The respondents address the lowest importance to the vaccination of poultry and locking up all poultry (lower means and lower percentages that assign high importance scores). The highest scores were for the following measures: stocking antiviral medicine (concrete protective risk regulation measure) and providing information about how to prevent contamination with the virus and information about the risks involved with the bird flu (percentages vary from 88% to 98% and means from 4.4 to 4.66). The opinion leaders score significantly higher on all measures, except for the vaccination of poultry (moderate means and percentages) and the provision of information about how to prevent contamination with the virus (both rate this measure as very important: high means and high percentages). There are also significant gender differences for most of the measures: women score significantly higher than men, except for the proposal to abandon import of poultry from high risk countries and information provision about prevention. This may lead us to the conclusion that women are more involved with the risk than men. For age differences, we only found significant results for performing strict controls of the obligatory safety measures (youngest age category has the highest mean) and abandoning the import of poultry from high risk countries (oldest age category has highest mean). As we did not really find a substantial explanation for these differences and there were no age differences for the other measures, we cannot state that there are general well-founded differences between the age groups.

7.4. General governmental information

In the next paragraph, we will discuss the particular perception of the role of the government to inform the civilians as good as possible about dispersion and prevention of the virus and the specific need of the people to participate in the governmental communication process. Both statements were measured on a 6 point Likert scale.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Duty of government to inform civilians as good as possible (dispersion, prevention…)			Male = 5.06 Female = 5.29 *t (318)=-2.49**			
Non-OL	5.16	0.80			1	81
OL	5.38	0.99			2	83
Need for participation			Male = 2.58 Female = 2.91	<35 year =2.43 35-44 year = 3.12		
Non-OL	2.54	1.15	*t (318)=-2.43**	45-64 year = 2.96	50	5
OL	3.80	1.10		>64 year = 3.09	11	24
	*t (304)=-7.01***			*F(3,313)=6.19****		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 84: Perceptions about the governmental information in the context of the bird flu

Both opinion leaders as non leaders give high ratings for the statement that it is the duty of the government to inform civilians as good as possible about the dispersion and prevention of the bird flu virus: the means are 5.16 and 5.38 (difference is not significant) and more than 80% of the respondents agrees to strongly agrees with the statement (only 1% to 2% does not). This illustrates again the important role of the government as a risk communicator.
There is a higher need for participation for the opinion leaders (mean = 3.8, 24% scores high on this need and only 11% does not feel the need to participate) than for non leaders (significantly lower mean of 2.5 and 50% does not feel the need to participate.
Again, women have significant higher scores on both concepts, indicating that they are more involved. We could already deduct from the opinion leaders profile that they exist more out of women than men, this explains of course the differences that are presented here. The youngest age category scores significantly lower than the other age groups on the need for participation.
So we can conclude that all respondents perceive it as the task of the government to communicate about the risk of the bird flu and that especially the opinion leaders will feel the need to communicate with the government about the risk and take part in a two way communication flow.
The next section will take a look at the specific perceptions about the quality, quantity and reliability of governmental information about the risk of the bird flu.

7.5. General perception of government as risk regulator and risk communicator

For the perception measurement of the quality of the governmental communication efforts, we added some new items that are more specific than the single item that we used in the previous studies in the context of terrorism ("I think the quality of the governmental information is good"). The added items are more specific. We performed a Factor Analysis (PCA with varimax rotation) to explore and eventually confirm the dimensions. The analysis revealed 3 factors that explained almost 70% of the variances. The cronbach's alpha values for the three constructs exceed 0.65 (they range from 0.84 to 0.89) so the internal consistency of the scales is confirmed.

Construct/items	**Factor loadings**			
Total variance explained: 69.83%	**I**	**II**	**III**	**IV**
Quality of governmental information (α=0.87)				
Governmental information about the bird flu is:				
Sufficiently scientific	0.78			
Sufficiently up to date	0.76			
Sufficiently specific	0.75			
Sufficiently interesting	0.73			
Sufficiently comprehensible	0.67			

Sufficiently more reliable than info from the media	0.62			
Sufficiently more available through various channels	0.59			
Reliability of governmental information (α=0.89)				
Reliability info from provincial government		0.88		
Reliability info from local government		0.86		
Reliability info from federal government		0.81		
Quantity of governmental information (α=0.84)				
The Belgian government provides us with a sufficient amount of information about the bird flu (virus)			0.79	
The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of the bird flu			0.64	
To what degree do you thing that the federal government offers a sufficient amount of information about terrorism?			0.64	
To what degree do you thing that the local government offers a sufficient amount of information about terrorism?				0.89
To what degree do you thing that the provincial government offers a sufficient amount of information about terrorism?				0.83
Note: Extraction Method: Principal Component Analysis. Eigenvalues>1. Rotation Method: Varimax. Missing values: cases excluded listwise.				
General trust in the government in context of bird flu (α=0.79)				
To what extent do you perceive the following governments as being prepared to terrorist attacks: national government				
To what extent do you perceive the following governments as being prepared to terrorist attacks: provincial government				
To what extent do you perceive the following governments as being prepared to terrorist attacks: local government				
Our hospitals are sufficiently prepared for an outbreak of the bird flu				
The government is making enough efforts to prevent an outbreak of the bird flu				
I do not think that the government has to take more severe safety measures to prevent an outbreak of the bird flu RECODED				

Table 85: Factor analysis (PCA with Varimax rotation) for governmental communication constructs in context of the bird flu

The general trust construct exists of 6 items. The chronbach's alpha is 0.79 so we can consider the scale as internally consistent.

We will now interpret the descriptive statistics for these concepts.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
General trust in government	3.35	0.67			26	21
Non-OL	3.12	0.85			41	20
OL						
Quality of govinfo						
Non-OL	3.87	0.70			6	46
OL	3.90	0.91			17	59

Quantity of govinfo				
Non-OL	3.44	0.78	30	30
OL	3.35	0.98	41	35
Reliability of govinfo				
Non-OL	3.47	0.75	13	41
OL	3.50	0.87	19	45
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001			

Table 86: Descriptive statistics for the governmental communication constructs

The general trust in the government is moderate (means of 3.12 and 3.35) and only 21% of the respondents have high confidence scores. This is probably due to the fact that there are rather low perceived preparedness levels for the local governments compared to the perceived preparedness level of the national government. On the other hand, 26% (non opinion leaders) and 41% (opinion leaders) of the respondents have indicated low levels of confidence, so there is a large fraction of people who have a rather neutral attitude towards the government in terms of trust (39% to 53% answers neutrally).
The perceived quality of the governmental information is good: the means are around 3.90 on the six point scale and 46% (non leaders) and 59% (opinion leaders) thinks the quality is good to very good. Only 6% to 17% assign low scores for quality.
The quantity has lower means (3.44 and 3.35) and less people assign high scores (30% and 35%). More people are not satisfied with the quantity of governmental information about the bird flu (30% and 41% assign low scores).
The reliability is moderately rated (3.47 and 3.50) and 41% and 45% assigns high scores to the general reliability of governmental information about the bird flu. We have to take into account however that there were some differences between the reliability of the local, provincial and national governmental information. There were no significant differences for opinion leaders versus non leaders, gender or age categories.
The multivariate analysis that includes the correlations between the concepts and the basic structural equation models will be discussed in the next section.

8. Multivariate analyses

We decided to perform the correlations both for the non-opinion leaders as for the opinion leaders, as we assume that some correlations might be stronger for opinion leaders than for non-opinion leaders.

8.1. Correlations general concepts

The negative linear relationship between mental distance and risk perception (r=-0.35 and -0.42) is of course a very likely result as the lower the mental distance towards the risk will be, the higher the perceived risk is (and vice versa). We also found a moderate linear

relationship between fear and risk perception, which is stronger for opinion leaders (r=0.29) than for non opinion leaders (r=0.19). Focusing on behaviour, we notice a moderate negative relationship with mental distance (-0.20) and a stronger positive linear relationship with risk perception (r=0.37) but we could not confirm this for the opinion leaders, probably because of the limited number of cases. The most important results from this table are related to information seeking behaviour. The need for information correlates moderately positively with risk perception (r=0.25 for non leaders) and of course negatively with mental distance (r=-0.14 for non leaders and -0.30 for opinion leaders). Information seeking behaviour correlates positively with risk perception as well (r=0.22) and with fear for both opinion leaders (r=0.37) and non leaders (r=0.22). We notice that this linear relationship is stronger for opinion leaders. We also notice that the social behaviour of people (talk) correlates positively with information seeking behaviour (r=0.45 and r=0.21), protective behaviour (r=0.50 and r=0.39) and information need (r=0.45 and r=0.54). This last moderately strong linear relationship between information need and social behaviour indicates that the more people need information, the more they will talk to others about the risk (and vice versa). There are also non negligible positive relationships between social behaviour and risk perception (r=0.22) and fear (r=0.14 and r=0.20, however the latter is not statistically significant due to the limited sample size again).

Finally, we will discuss the concept of trust and its correlates. At first sight, the trust level lowers when the risk perception level rises (r=-0.30 and r=-0.44) and when fear levels rise (r=-0.14). Second fact is that, the lower the trust levels are, the higher the need for information will be, and this positive correlation is much stronger for opinion leaders (r=0.41) than for non leaders (r=-0.13).

To summarize these findings, we can state that risk information seeking has empirically confirmed positive relationships with risk perception and fear. The need for information is correlation with risk perception and fear as well, but particularly with the concept of trust and this especially accounts for the opinion leaders. The correlations are stronger for opinion leaders when it comes to the linear relationships between risk perception, information need and trust.

	Mental distance		Risk perception		Fear		Behaviour		Info need		Info seeking		Info sufficiency		Talk	
	Non OL	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***
Mental distance																
Risk perception	**-0.35*** **	***-0.42****														
Fear	-0.02	*-0.19*	**0.19****	***0.29****												
Behaviour	**-0.20*** **	*-0.20*	**0.37*** **	*0.24*	**0.18****	*0.17*										
Info need	**-0.14***	***-0.30****	**0.25*** **	*0.28*	**0.25*** **	*0.07*	**0.44*** **	*0.12*								
Info seeking	-0.04	*-0.27*	**0.22*** **	*0.10*	**0.22*** **	***0.37****	**0.41*** **	*0.08*	**0.64*** **	***0.35****						
Info sufficiency	**-0.22*** **	*-0.02*	**0.13***	*-0.09*	-0.03	*-0.15*	0.16*	***0.35****	**0.18****	*-0.16*	**0.13***	*-0.21*				
Talk	**-0.15***	*-0.26*	**0.22*** **	*0.22*	**0.14***	*0.20*	**0.50*** **	***0.39****	**0.45*** **	***0.54**** **	**0.45*** **	*0.21*	**0.21*** **	*0.21*		
Trust	**0.18****	***0.32****	**-0.30*** **	***-0.44****	**-0.14***	*-0.09*	-0.20	***-0.34****	**-0.13***	***-0.41****	-0.07	*-0.10*	0.06	*0.12*	-0.01	*-0.24*
Significance key * p≤0.05 ** p≤0.01 *** p≤0.001																

Table 87: Correlations of the general constructs in the context of the bird flu

	Quality govinfo		Quantity govinfo		Reliability govinfo	
	Non OL	***OL***	**Non OL**	***OL***	**Non OL**	***OL***
Quality govinfo						
Quantity govinfo	**0.59*** **	***0.57**** **				
Reliability govinfo	**0.40*** **	***0.55**** **	**0.57*** **	***0.77**** **		
Trust	**0.42*** **	***0.31****	**0.64*** **	***0.74**** **	**0.51*** **	***0.54**** **
Info need	-0.04	*-0.11*	**-0.14***	*-0.13*	-0.10	*-0.15*
Info seeking	0.02	*-0.12*	-0.04	*0.002*	-0.06	*0.04*
Info sufficiency	**0.15***	***0.29****	**0.15***	*0.22*	**0.17****	***0.25****
Talk	0.04	*-0.10*	0.01	*-0.01*	0.04	*-0.06*
Significance key * p≤0.05 ** p≤0.01 *** p≤0.001						

Table 88: Correlations of the constructs for governmental communication in the context of the bird flu

8.2. Correlations governmental risk communication

The correlation table of the governmental communication traits unveils some interesting significant linear relationships. The perceived quality of the governmental information correlates strongly with the perceived quantity (r=0.59 and r=0.57) and with the perceived reliability (r=0.40 and r=0.55). The perceived quantity of governmental information is even correlated more strongly than the perceived quality with the perceived reliability. Remarkable is the fact that this correlation is much stronger for opinion leaders (r=0.77) than for non leaders (r=0.57). We found a parallel result for the strong positive relationship between trust and perceived quantity of information: the correlation between both concepts is higher for opinion leaders (r=0.74) than for non leaders (r=0.64). Besides this results, trust levels will also increase as the perceived quality (r=0.42 and r=0.31) and reliability (r=0.51 and r=0.54) increase.
The last correlation we want to mention is a moderate positive linear relationship between information sufficiency and the reliability of governmental information, again stronger for opinion leaders (r=0.25) than for non leaders (r=0.17). So we can state that people who think that the governmental information about the bird flu is reliable will also have higher trust levels and vice versa.
To conclude, we want to summarize the empirically proven correlations by saying that there are some very strong and non negligible linear relationships between the perceived satisfaction with the quantity, quality and reliability of information and the trust in the government as a risk regulator. It will be vital for the government to communicate sufficiently and provide the civilians with qualitative information about the risk. This will probably lead to higher reliability rates and increase the general trust in the government, who has to deal with the threat.
We found similar results in the other contexts as well (terrorism and the financial economical crisis), that is why we will now try to validate the three basic structural equation models in the context of the bird flu as a risk.

8.3. Structural equation models

The following structural equation models were build and confirmed four times in the context of terrorism. The multivariate relationships that are tested with these models were found to be stable. Our aim now is to confirm the same models in the context of the bird flu. The first model considers the relationship between the government as a risk communicator and as a risk regulator. The second model incorporates the concepts of need for participation and opinion leadership.

8.3.1. Relationship government as a risk communicator and risk regulator

Again, Amos, a statistical software package for SEM was used to estimate the parameters. The chi-squared p- value should exceed 0.05, however, with large samples, this value is not reliable. To counter this, we performed chi-square analyses on a random, small sub-sample of 100 respondents. The analysis of the first model revealed very nice results.

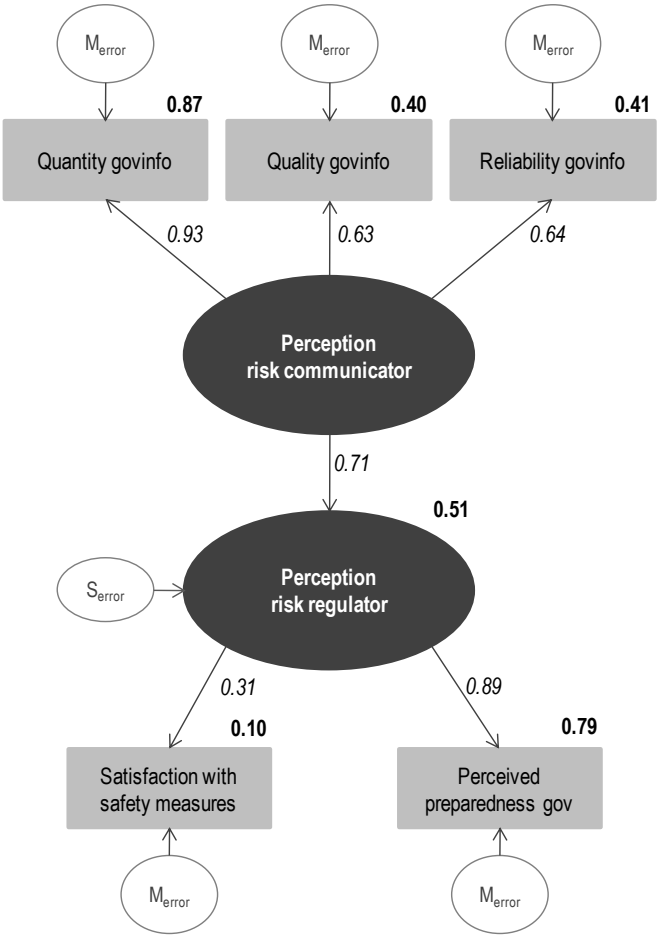


Figure 50: SEM integrating the relationship between the perceptions of the government as a risk regulator and as a risk communicator in the context of the bird flu

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Bird flu	*6.15*/ 4 / 0.19		0.99	0.99	0.98	0.04

Table 89: General parameters of fitness of the basic SEM model in the context of the bird flu

The model shows us the relationship between the satisfaction with the government as a risk communicator and the satisfaction with the government as a risk regulator. The chi-squared p value for the full sample is 0.19. So even with a sample larger than 200, we found that the

actual and the predicted are not statistically different. This means that the proposed model fits the observed covariances and correlations well.
The NFI, CFI and TLI values all exceed the critical value of 0.90 abundantly (NFI=0.99, CFI=0.99 and TLI= 0.98) and the RMSEA value (0.04) is very good.
The perception of the government as a risk communicator is a latent variable that is measured by the three manifest variables: satisfaction with the quantity and quality of the governmental information about the bird flu and the perceived reliability of the information provided by the government. We should mention that the constructed scale 'quality of governmental information' consists of completely different items (6 items, alpha=0.79) than the concept we used in the context of terrorism (1 item) (see above).
The regression weights (standardized beta values, marked in *italic*) of these three variables are all very high and the satisfaction with the quantity of governmental information has the largest weight in the prediction of the perception of the government as a good risk communicator (beta=0.93, p<0.001), followed by reliability of governmental information (beta=0.64, p<0.001) and quality of governmental information (beta=0.63, p<0.001). The perception of the government as a risk regulator is a latent variable, measured by two manifest variables. The perceived preparedness of the government is the most important predictor (beta=0.89, p<0.001), followed by the satisfaction with governmental safety measures to prevent a possible outbreak of the bird flu (beta=0.31, p<0.001). The most important conclusion from this analysis is that the total amount of explained variance in the perception of the government by the perception of the government as a risk communicator is 51%, which is rather high (beta=0.71, p<0.001).

8.3.2. Incorporating the participation and opinion leadership concepts

The second model incorporates the need for active participation in the two communication flow between government and public and the concept of opinion leadership. The model is also found to be significant. The chi-squared value for the full sample (n=320) however was 0.002, so we decided to perform the analysis on a subsample of 100 respondents. The chi-squared value raise to 0.09, so we have statistical evidence that the model fits the data. The NFI, CFI and TLI values all exceed 0.90 as well (respectively 0.95, 0.97 and 0.93) and the RMSEA value is acceptable (0.06). The next step is the interpretation of the beta-values and the explained variances.

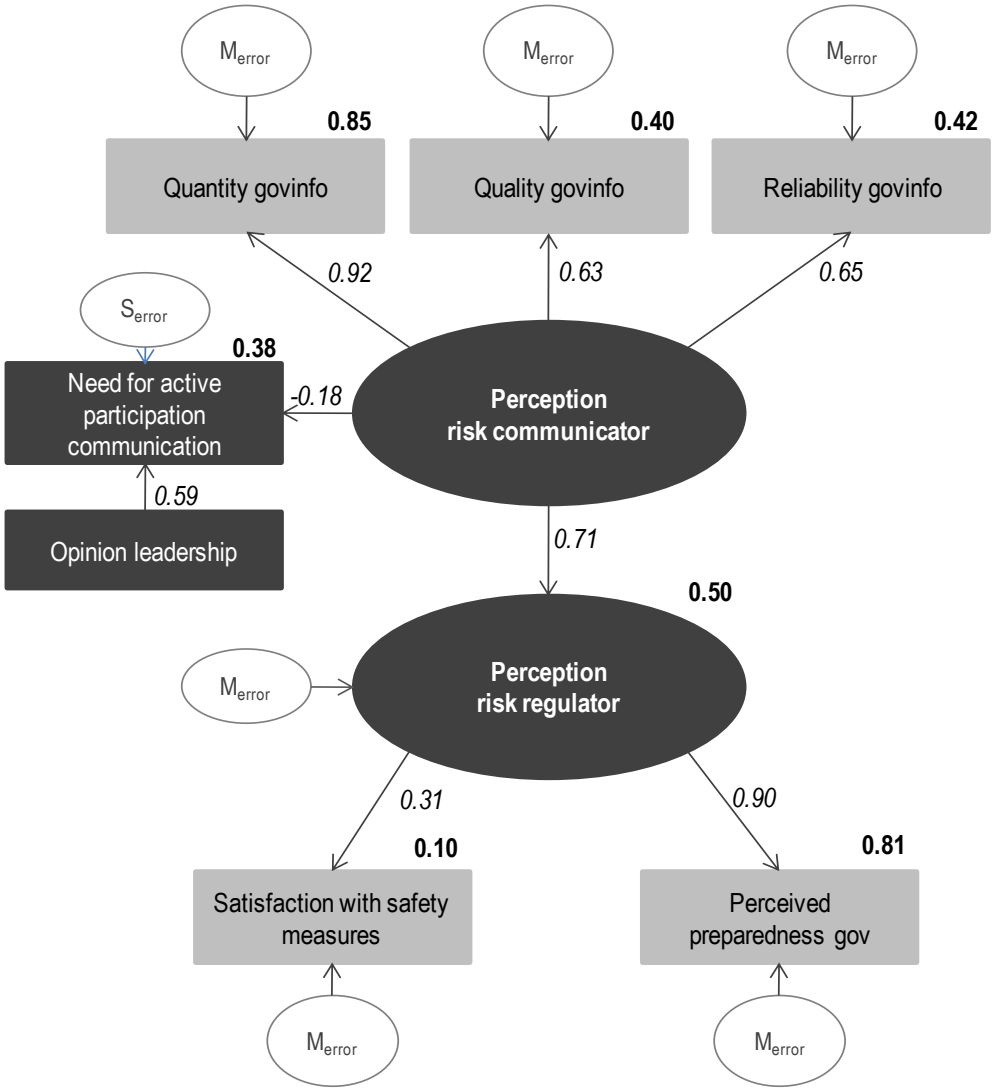


Figure 51: SEM linking bottom-up communication and opinion leadership in the context of the bird flu

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Bird flu	32.50/ 13 / 0.002	20.38 / 13 / 0.09	0.95	0.97	0.93	0.06

Table 90: General parameters of fitness of the SEM model linking bottom-up communication and opinion leadership in the context of the bird flu

The results show us that the satisfaction with the government as a risk communicator has a negative causal relationship with the need for bottom-up communication (beta=-0.18, p<0.001) which means that the more people are satisfied with the government as a communicator, the less they will feel the need to communicate with the government about the bird flu themselves. We can also state that the opinion leadership concept has a strong positive causal relationship with the need for bottom-up communication (beta=0.59, p<0.001) which means that the higher people rate on opinion leadership, the more they will feel the need to exchange knowledge with the government about terrorism. Opinion leadership and satisfaction of the government as a risk communicator together explain 38% of the variance within the variable that measures the need for bottom-up communication.

So for governments, it is important to communicate effectively, but also to determine who those opinion leaders are and how they can be reached, because this group of people that is characterized by a high level of influence on other social groups within society and an extensive information searching behaviour will feel the need to communicate about the risk of bird flu.

9. Conclusion research report bird flu

In this second research report, we presented the results of a moderately scaled quantitative survey study that scrutinized the risk perception construct and its related concepts in the context of the bird flu. Our data (n=320) allowed us to construct, confirm and validate our main measurement scales that measure the key concepts that surround risk perception in the context of the bird flu. In this concluding paragraph, we will confront the results of the analyses with the central research objectives. The first, descriptive part provided a clear descriptive report on the perceived risk of the bird flu and the related concepts of mental distance, fear, protective behaviour, information seeking behaviour and social behaviour. Again, for many concepts, we notice that a large portion of the respondents answers neutrally and does not have an outspoken opinion about the bird flu. This might be a sign that there is a lack of interest, or a lack of knowledge about the risk. On the other hand, some specific significant gender and age differences were revealed. For risk perception and mental distance, the figures indicate that the bird flu virus is perceived as a threat that is present in one's close environment, but that it is not perceived as something that will happen to the respondents personally. More in depth analysis of the specific perceived probability levels, the data revealed levels that are rather high but decrease according as the threat is positioned in the near proximity of the respondents. So we can clearly see that the bird flu as a threat is a perceived risk that is near, but it will not affect the person himself. For concrete protective behaviour of the respondents, we notice that, even though some protective actions were obligatory (locking up poultry), the percentages of people who really implemented these actions were rather low. For information seeking, information needs and social behaviour, the percentages of respondents with high scores were very low as well. Both active as event triggered information seeking is not performed intensively by our respondents. Passive information scanning has a higher score. These figures indicate that there are not many people looking for information about bird flu or talking about it. We did find some gender and age differences. Women have significantly higher means for information seeking, information need and social behaviour, indicating that they might be more involved with the matter than men. Concerning the age groups, we found more significant differences. The youngest age category has the lowest level of fear, information need and information seeking, indicating that they are not so involved. The category of 35-44 years has the lowest mental distance, the highest need for information and the highest information seeking level. These differences indicate that it might be valuable to try to identify the crucial target groups for risk communications about the bird flu.

We can state that we provided a full and comprehensive report on the descriptive statistics of the central concepts in our risk management strategy and that the first research objective has been accomplished. As mentioned, the gender and age differences already indicated that some specific profiles will have higher scores on certain concepts. So let us now take a look at the conclusion that we can draw for the second research objective.

The second research objective included a confirmation of the information seekers segmentation and validation of the tool to identify opinion leaders. As we assumed, we could confirm the four target groups that were found in the context of terrorism as well, based on the three basic concepts (five items): information seeking, social behaviour and the opinion leadership trait. The cluster analysis indicated that 15% of our respondents could be classified as opinion leaders. This percentage is somewhat lower than in the context of terrorism (21% to 25%). The classification matrix of the discriminant analysis stated that more than 96% of the cases are correctly assigned to the predicted groups. For the most important group in this study, the opinion leaders, this percentage is 87%, which is rather low, but this is probably due to the smaller sample size which leads to the fact that within the group of opinion leaders, there are only 47 respondents (from which 41 are classified by the discriminant analysis as opinion leaders). For all further analyses about governmental communication efforts, we compared the results of the opinion leaders versus the non leaders (talking scanners, silent seekers and ignorants). Let us start with a brief summary of the opinion leaders' profile. Opinion leaders are mainly female, but the difference is not very outspoken (45% men versus 55% women). The mean for age is almost 48 years old, which is rather high compared to the other groups. The respondents in the opinion leadership group are rather highly educated. This group of people scores significantly higher on all constructs, except for mental distance. The results indicate that our most important target group, the opinion leaders, are most worried about the risk of bird flu, that they have a high need for risk communication and that they look for information about the bird flu more intensively. As for their specific media profiles, we can conclude that the percentage of people that often look for information about the bird flu by means of the various media is generally much higher for opinion leaders than for non-leaders. The media that are most frequently consulted are newspapers, followed by TV and radio. Magazines and governmental communication efforts on public television and radio are moderately consulted. Governmental communication channels are not consulted by a lot of people who look for information about the bird flu, but these channels are perceived as reliable by a large part of the respondents. We can assume that this is simply because of the fact that the government is currently not communicating very intensively by means of these communication tools. Another contradiction lies within the result that a relatively large portion (especially opinion leaders) thinks that people in their personal environment are reliable sources for information about the bird flu but only very few people actually consult personal contacts for information. We can counter this with the fact that experts are perceived as very reliable by the large majority of the respondents and again, we assume that experts can be perceived as the vital sources of information for opinion leaders and that the non leaders

will perceive both experts in the media as people in their personal environments as reliable sources of information about the bird flu. We are also hypothetically assuming that, even though not many people perceive the internet as a reliable source, the governmental information that would be communication through various forums, official websites etc… will be consulted, especially by the opinion leaders, and will be perceived as reliable sources of information. As for the general perception of the government as a risk communicator in the context of the bird flu, the reliability levels of the governmental information are rather high, exposing an opportunity for the governments to start with an initial image as a reliable information source. The public perceptions about the government as a risk regulator in the context of the bird flu are very dispersed. The perceived preparedness of the governments decreases with the level of the governmental instances. The European government and the national governments are perceived as rather prepared. On the other hand, the provincial government, responsible for the first in line crisis planning, is perceived as less prepared and the local government has got the lowest scores. Remarkable is that a relatively large portion thinks that the national and local governments are not prepared on a crisis situation due to the bird flu. As for the perceptions about the specific governmental initiatives that should be taken in the context of the bird flu, the respondents assigned the highest scores to the following measures: stocking antiviral medicine (concrete protective risk regulation measure) and providing information about how to prevent contamination with the virus and information about the risks involved with the bird flu. The opinion leaders score significantly higher on all measures, except for the provision of information about how to prevent contamination with the virus, that was perceived as a very important protective safety measure by both opinion leaders and non leaders. Another result was that almost all respondents perceive it as the task of the government to communicate about the risk of the bird flu and that especially the opinion leaders will feel the need to communicate with the government about the risk and take part in a two way communication flow. The general trust in the government is moderate. This is probably due to the fact that there are rather low preparedness levels for the local governments compared to the perceived preparedness level of the national government. The perceived quality of the governmental information is good and only a small fraction assigns low scores for the quality of governmental information about the bird flu. On the other hand, a larger fraction is not satisfied with the quantity of governmental information about the bird flu. The results indicate that people are generally not satisfied with the amount of information that is being spread by the government(s) about the bird flu. The reliability is moderately rated.

The third research objective was to scrutinize the multivariate relationships between the key concepts. We first performed the correlation analyses that revealed some interesting linear relationships: we can state that risk information seeking has empirically confirmed positive relationships with risk perception and fear. The need for information is correlation with risk perception and fear as well, but particularly with the concept of trust and this especially accounts for the opinion leaders. The correlations are stronger for opinion leaders when it comes to the linear relationships between risk perception, information need and trust. For

the governmental communication concepts, we found some very strong and non negligible linear relationships between the perceived satisfaction with the quantity, quality and reliability of information and the trust in the government as a risk regulator. It will be vital for the government to communicate sufficiently and provide the civilians with qualitative information about the risk. This will probably lead to higher reliability rates and increase the general trust in the government, who has to deal with the threat. As we found similar results in the context of terrorism, we assumed that our structural equation models that we build in the first context could be confirmed in the context of the bird flu as well. Again, the strong relationship between the government as a risk communicator and a risk regulator is statistically confirmed. Especially the second model, which incorporates, besides the basic relationship between the government as a risk communicator and risk regulator, the concepts of opinion leadership and need for active participation in the communication flow, is of great importance. The results indicate that the satisfaction with the government as a risk communicator has a negative causal relationship with the need for bottom-up communication which means that the more people are satisfied with the government as a communicator, the less they will feel the need to communicate with the government about the bird flu themselves. We can also state that the opinion leadership concept has a strong positive causal relationship with the need for bottom-up communication which means that, the higher people rate on opinion leadership, the more they will feel the need to exchange knowledge with the government about terrorism. Opinion leadership and satisfaction of the government as a risk communicator together explain 38% of the variance within the variable that measures the need for bottom-up communication. So for governments, it is important to communicate effectively, but also to determine who those opinion leaders are and how they can be reached, because this group of people that is characterized by a high level of influence on other social groups within society and an extensive information searching behaviour will feel the need to communicate about the risk of bird flu.This study was a confirmatory survey study to validate the methodology in another risk context. It included a limited sample of 320 respondents. However, besides the interesting descriptive statistics, we also found statistical confirmation of the two research objectives that we wanted to achieve in specific risk context. A first glance at the descriptive percentages and means could mislead governmental officials in the sense that the figures are not very arousing. But when we take a look at the figures for our main target group, the opinion leaders, we notice that this groups significantly scores higher on most concepts. Especially the multivariate analyses pointed out that opinion leaders can play a crucial role in effectively spreading risk information about the bird flu and preparing the community for a crisis situation. The specific media profile and information needs of the opinion leaders allow us to construct very customized risk communication programs. As in the context of terrorism, it is important to construct communications that include both information that is primarily to be diffused by governmental institutions for crisis management reasons and the specific information that is desired by the opinion leaders.

RESEARCH REPORT III

THE FINANCIAL AND ECONOMICAL CRISIS

1. Introduction to the topic: the financial and economical crisis as a new (social) risk

"The 2008 global financial crisis has been compared to a 'once-in-a-century credit tsunami', a disaster in which the loss of trust and confidence played key precipitating roles and the recovery from which will require the restoration of these crucial factors."(Earle, 2009 p.786)

Since the beginning of the worldwide financial and economical crisis in 2008, academic interest in certain issues such as trust and confidence in this specific context has been increasing. Earle mentions that the crisis *"is already recognized as one of the greatest risk management failures in recent history"* (Earle, 2009 p.786). He draws the analogy with certain risks and crisis situations in other fields such as technological hazards or other environmental risk management issues. As previous research has indicated that trust and confidence play important roles in the risk management process in all fields of risk types (Davies et al., 1987b; R. Peters et al., 1997a; Wouter Poortinga & Pidgeon, 2004), Earle tries to discuss the importance of the two concepts in the specific context of the financial crisis. He also provided us with some clear facts and figures from a national public opinion poll that was initiated in the U.S. after the first bailout plan: some figures are stated below:

A record high of 88% rated the condition of the national economy as "fairly bad" or "very bad."
A near-record high of 93% thought that the economy was "getting worse" or "staying about the same."
Trust in the federal government was at a record low, with only 17% saying they trust it "always" or "most of the time."

These results illustrate the raise of general distrust and the increasing lack of confidence in crisis situations that stretch over longer periods of time.
Mazur has shortly discussed the presumed large scale effects of the intensive media coverage on the U.S. financial crisis, beginning September 6, 2008. He claims, however he does not empirically prove, that this media coverage has exacerbated underlying financial problems and facilitated the global diffusion of risk panic (Mazur, 2009). He quotes the discrepancy between the reality, fact and figures, and the perceptions and mental models

that are induced by the intense media coverage. He also states that the primary reactions are emotional and rather extreme, creating a loss of confidence in and negative perceptions of the responsible governmental institutions and Wall Street, resulting in a sharp cutback in consumer expenditures. He refers to these ripple effects as the results of a social amplification of risk (see chapter one). However, he concludes his article by stating that people eventually habituate to warnings, and media coverage becomes less frequently and less specific, placing crisis related issues further into the newspapers and news. So the real threat and risk does not disappear, nor does the perception of the risk, but the panic gradually recedes and the fear levels and concrete preventive behaviours of people (spending less, redrawing savings,…) lower.
The financial and economical crisis has also been labeled as a 'new' or 'new social' risk, as defined by Beck. As mentioned in the first chapter, the public in the modern risk society question the promise of security and the idea of insurance, the two main building blocks of the modern welfare states (Beck, 1992; Beck, 1999). Chan is one of the authors who labeled the financial crisis as a social risk:

"When the financial crisis deepened, the sense of being 'at risk' spread from the vulnerable and marginalized social groups to other classes. These new social risks, coupled with family instability and government's mismanagement of the economy, engendered further risks." (R. K. H. Chan, 2009 p. 25)

Despite the lack of academic publications on the financial and economical crisis as a social risk, we can state that the key components in risk management literature has already been tackled and put out front: risk perception, trust and confidence are again the key building blocks that will have to be incorporated in the risk management strategies.
The financial and economical crisis is labeled as a crisis in the first place, but it still brings along many risks that are very uncertain, especially in Europe as governments do not dare to proclaim the troubles in the financial sector as a general 'crisis' yet. The mental model of the general public is one that is strongly build on the idea of being 'at risk', not being in a crisis. We have the impression that, as long as the terminology of risk is used, the traits that go along with the risks are perceived to be associated with individuals. On the contrary, when we speak about a common crisis, the mental associations with the crisis reach much further than individuals. The entire society and national economy is covered, so people will feel much more involved as they make part of the society and the national economy, that cannot be controlled by them personally.
The financial crisis can be labeled as a new risk as it possesses some of the general traits that have been formulated by Beck: the presence of the crisis as a risk is mostly ascertained by experts, the consequences are irreversible, the risks are no longer bound to time or location and the possible damage of the new risks is so large, that previous responds such as insurance and responsibility are deficient.

2. Objectives of the studies

This research study also focuses on the concepts of risk perception, risk information seeking behaviour and trust in the government as a risk regulator and risk communication in the context of the financial and economical crisis as a new risk. The primary objective is to validate the methodology in a new risk context: the financial and economical crisis. Besides the key constructs, the study incorporates some additional concepts, especially related to the opinion leadership identification model. The main concrete objectives of this study are similar to the objectives of the previous studies in the context of terrorism and the bird flu.

1. Confirmation of the measurement scales (validation and reliability analyses)
   In scale development processes, it is common that academics use split-half techniques to come to several independent samples to validate and compute the reliability of measurement scales (Hinkin, 1998; E. F. J. Ter Huurne, 2008). However, this study is the sixth study that has been performed to our methodology. So instead of splitting samples into half, we have six full samples that were used to validate the measurement scales.
2. Delivering a full and comprehensive descriptive report of the central concepts in our risk management strategies, including risk perception, mental distance, fear levels, specific behavioural intentions, information seeking behaviour and trust in the government.
3. Confirmation of the risk information seeking segmentation and the validation of the tool to identify opinion leaders. However, we tried to optimize the identification tool by adding some additional items concerning opinion leadership.
4. Developing concrete communication guidelines and a concise risk communication strategy in the specific context of the financial and economical crisis.

3. Research method and survey construction

For the operationalization of the central research concepts, we based ourselves on the survey questions that have been used in the previous research contexts of terrorism and the bird flu. However, since the development of this tool is an iterative process, we decided to develop some new concepts and items that face the need that had raised in the previous research conclusions. We will describe these new concepts and their components and validate the new measurement scales further in this chapter. Most of the items (statements) were measured on 5-point Likert scales (Totally do not agree – Totally agree) that followed statements.

4. Sampling procedure

The population we want to scrutinize are the Flemish people starting from 18 years old. We did not have the necessary resources to take a sample in the Walloon region of the country. In total, 280 students each had to select 6 respondents according to our selection criteria: 2 male and 2 female respondents, one respondent from each category of age, starting from the age of 18 as minors are less relevant in our studies. The age categories were as follows: 18-24 years, 25-34years, 35-44 years, 45-54years 55-64 years and >64years. Eventually, 1680 questionnaires were distributed in the period of December 2007 – January 2008. From this sample, 1578 surveys could be used for analysis after the data cleaning. The quota sample can be labelled as representative for the population of Flanders, Belgium as we controlled the sample for gender, age and educational level.

5. Sample descriptive statistics

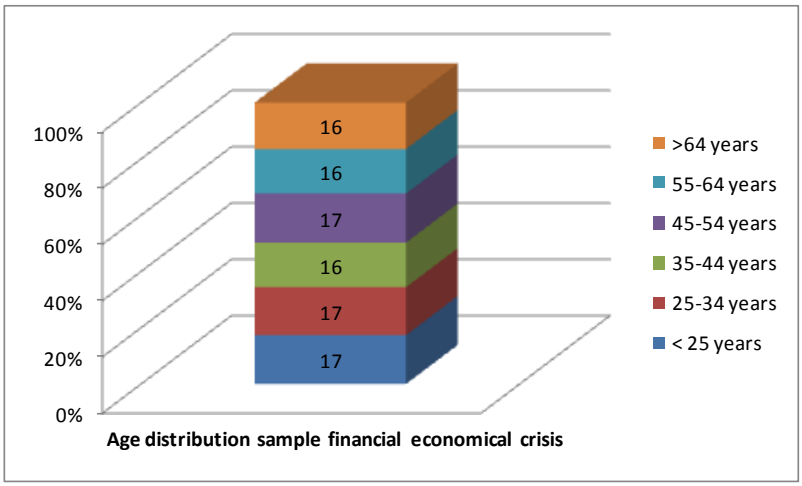


Figure 52: Age distribution sample financial crisis

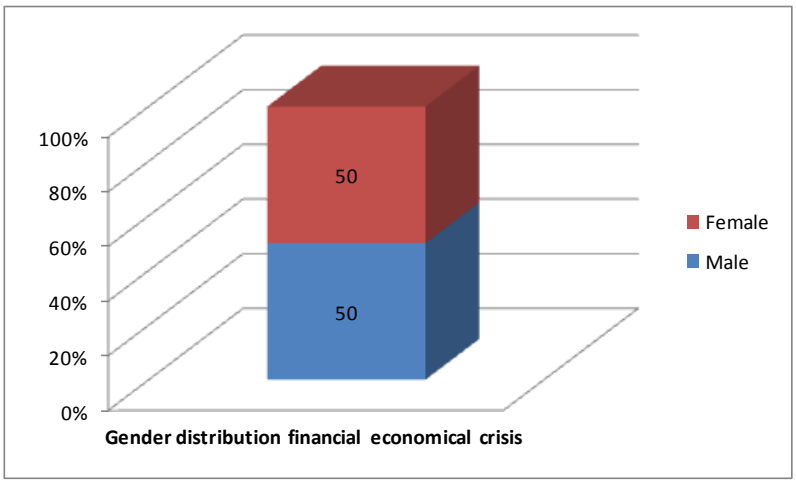


Figure 53: Gender distribution sample financial crisis

We also compared our sample details to the population facts that are provided by the National Institute of Statistics in Belgium. However, the available population statistics are not that detailed. We can only base ourselves for age groups on the facts of the age categories <20 years, 20-54 years and ≥65 years. We left the age group of <20 years out of the control check as we did not questioned minors. We can see that the largest difference between the sample en the population is 4% (overrepresentation male 20-64 yrs in sample). We decided not to weigh this subsample as the difference is minimal.

Age category	Male		Female	
	Flanders	Sample	Flanders	Sample
20-64	39%	43%	38%	39%
≥65	9%	7%	13%	10%
$N_{Flanders}$ =6161600 N_{sample} =1578				

Table 91: Comparisons sample and population percentages sample financial crisis

Missing data

The percentage of missing data was acceptable and we have no indications of non ignorable missing data.

6. Reliability and validity

The cronbach's alpha's were calculated and integrated in the subjoined overview. The values all exceeded 0.70 (threshold), except for the information need concept (alpha = 0.67), but all outputs showed that the item-total correlations for all items exceeded 0.30 and that the alpha if item deleted values never increased significantly when a particular item was deleted.

Construct	N	Items	α
Risk perception	**3**	I think the fin/ec situation will get worse I think that there is a real chance that the fin/ec crisis will get worse Since the financial problems of Fortis and Dexia, I think that there's a big chance that other banks will get in financial troubles as well	**0.74**
Mental distance	**5**	I do not worry about the financial/economical crisis because it will mainly have its consequences abroad The fin/ec crisis does not affect me, it will not influence my way of life I do not worry about the fin/ec crisis because it mainly takes place in the U.S. The fin/ec crisis is something that takes place abroad	**0.81**
Fear	**2**	I'm sometimes afraid that I will lose my savings because of the fin/ec crisis I'm sometimes afraid that I will lose my job r=0.30***	

Behaviour	**10**	Please indicate for the following product categories whether your consumption behaviour has changed (10 product categories)	**0.92**
Information need	**5**	I feel the need to communicate with the government about the fin/ec crisis I feel the need to be more informed about the fin/ec crisis I need accurate information before developing an opinion about the fin/ec crisis I feel the need for immediate and reliable information about the fin/ec crisis (0800 hotline, website…) I miss a good communication and information flow about the fin/ec crisis	**0.67**
Information seeking	**5**		**0.87**
Active info seeking	1	I explicitly look for information about the fin/ec crisis in the media	
Event triggered info seeking	1	When there is new info about the fin/ec crisis, I will look for more information as quickly as possible	
Passive info scanning	3	When there is an item about the fin/ec in the news, I will follow this item with more attention I will never skip articles or information about the fin/ec crisis in newspapers When the tv or radio is on and there is some news about the fin/ec crisis, I will follow it with more attention than the other items that are mentioned	*0.84*
Info saturation	**1**	I have the feeling that I know enough about the fin/ec crisis	
Talking to others	**6**	When there has been a TV-programme about the fin/ec crisis, it will be discussed in my personal/social environment I think it's important to have the possibility to talk to friends/family/colleagues… about the fin/ec crisis When there is a news items about the fin/ec crisis, I will discuss it with others How often do you talk about the fin/ec crisis to the following (groups of) persons Familiy/friends/colleagues or fellow students (3 items)	**0.83**

Table 92: Factor analysis (PCA with Varimax rotation) for key constructs in context of the financial crisis

7. Comprehensive descriptive report

The first block of tables provides us with a descriptive overview of the general concepts that form the backbone of the studies. The tables only include statistically significant results. We decided to include both the means as indicators of centrality (with associated standard deviations) as the percentages of people who have low (1-2 on 5 point scale) and high (4-5 on 5 point scale) scores. The latter can also inform us about the degree in which people have a true opinion about a statement, as we have an idea about the percentage of people who have answered neutrally. Sometimes people do not have a pronounced opinion about certain issues, and this is important to be reflected in the tables.

7.1. General concepts

The scores of the concepts are continuous variables and range from 1 to 5.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Risk perception	3.79	0.65		<35 year = 3.71 35-44 year = 3.83 45-64 year = 3.91 >64 year = 3.71 *F(3,1556)=10.19****	8	22
Mental distance	1.78	0.68	Male = 1.73 Female = 1.83 *t (1569)=-2.75***	<35 year = 1.87 35-44 year = 1.68 45-64 year = 1.63 >64 year = 1.98 *F(3,1567)=21.35****	92	1
Fear	2.44	0.87	Male = 2.35 Female = 2.53 *t(1476)=-4.09****	<35 year = 2.24 35-44 year = 2.42 45-64 year = 2.59 >64 year = 2.59 *F(3,1474=17.11****	64	6
Behaviour	1.6	0.76		<35 year = 1,49 35-44 year = 1,62 45-64 year = 1,67 >64 year = 1,67 *F(3,1562)=6.09****	92	2
Information need	3.37	0.66		<35 year = 3.26 35-44 year = 3.34 45-64 year = 3.53 >64 year = 3.34 *F(3,1546)=15.70****	22	22
Information seeking	3.28	0.91		<35 year = 2.27 35-44 year = 3.33 45-64 year = 3.55 >64 year = 3.51 *F(3,1562)=64.29****	33	26
Info saturation	2.57	0.97	Male = 2.75 Female = 2.39 *t (1565)=7.63***	<35 year = 3.24 35-44 year = 3.33 45-64 year = 3.37 >64 year = 2.82 *F(3,1563)=3.60**	52	18
Talking to others	3.24	0.82		<35 year = 3.24 35-44 year = 3.33 45-64 year = 3.37 >64 year = 2.82 *F(3,1511)=26.13****	32	21
Significance key			* p≤0.05 ** p≤0.01 *** p≤0.001			

Table 93: Descriptive statistics general constructs in the context of the financial crisis

As the results illustrate, the risk perception is rather high (mean 3.79 and 22% perceives risk to be high) and the mental distance is low (mean=1.78), 92% thinks that the crisis is something that can affect their direct environment. The data revealed significant differences for age categories, where the group of 35-44 years and 45-64 years old have higher risk perceptions and lower mental distances, probably because they are more involved with the crisis as they are in the middle of their career cycle. The mental distance of men is lower than of women. When we take a look at the mean fear level, it is moderate (2.44) and only 6% has a high fear level. Men are significantly less frightened of losing their jobs or money than women. Also older people have significantly higher fear levels than the younger people, probably because of their lack of possibilities to cope with the consequences of the crisis and recover. When it comes to concrete behavioural intentions, the mean is low (1.6) and only 2% has or will take concrete actions. The information need and information seeking levels are rather high and we notice that the youngest age category scores least on these issues. People do not really have the feeling that they know enough about the crisis (mean =2.57 and 18% has a high info saturation degree). Next to the fact that people look for information, they also talk to others about the crisis (mean = 3.24 and 21% talks to others), except for the oldest age category, who score less on this concept.

The results indicate that on the one hand, risk perception levels are high and mental distances to the risk are low, but on the other hand, people are not very frightened and do not proceed to concrete protective behaviour (yet). This might indicate that the risk is perceived to be present but people do not think it will affect them personally. However, they need information so they look for information and talk to others about the risk to satisfy their need for information. Especially the people that have the highest involvement (mid of their careers) display these characteristics.

7.1.1. Information seeking behaviour

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Active info seeking	2.73	1.19	Male = 2.95 Female = 2.52 *t(1572)=7.26****	<35 year = 2.36 35-44 year = 2.82 45-64 year = 3.08 >64 year = 2.74 *F(3,1570)=35.92****	46	29
Event triggered info seeking	2.70	1.16	Male = 2.86 Female = 2.53 *t(1575)=5.64****	<35 year = 2.28 35-44 year = 2.71 45-64 year = 3.02 >64 year = 2.91 *F(3,1573)=41.99****	48	27
Passive info scanning	3.65	0.95	Male = 3.77 Female = 3.54 *t(1568)=4.87****	<35 year = 3.24 35-44 year = 3.72 45-64 year = 3.89 >64 year = 3.97	18	49

		*F(3,1566)=61.61****
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001	

Table 94: Descriptive information seeking behaviour in the context of the financial crisis

When we take a closer look at the information seeking behaviour, we notice that people rather passively scan information concerning the financial economical crisis (mean = 3.65, 49% have high scores) than actively look for information (mean = 2.73 and 29% high scores) or look for information when there is a new item on the crisis (mean = 2.70 and 27% high scores). Men have significantly higher scores on active, passive and event triggered information seeking than women. Concerning the age categories, the youngest category (<35 years old) score significantly lower than the other groups. The people who are most involved and most vulnerable are again the most active information seekers (active, event-triggered and passive).

Risk info nature	**How often do you look for the following type of information**		**Mean score/10**	**St.Dev.**	**% score ≥7/10**
	% rarely/never	% often/always			
Info about the probability that the financial economical crisis will become more severe	15	29	7,1	2,07	70
General information about the financial/economical crisis	10	31	7,3	1,8	75
Specific info about recent events in the financial sector (banks/)	18	31	7	2,1	66
Info about the controllability of the risk	24	23	6,6	2,2	60
Info about exposure to the risk	19	26	6,8	2,08	63
Info about the consequences of a financial/economical recession	14	29	7,1	1,9	70
Guidelines about what to do during a financial/economical recession	31	21	6,3	2,3	53
Info about who's responsible	31	28	6	2,4	46
Experiences of other people with the risk	40	13	5,5	2,4	38

Table 95: Specific risk information needs in the context of the financial crisis

Concerning the nature of risk information, we asked people what kind of risk information they look for (how often, six point scale) and what kind of information they perceive as most important (score on 10). Top information categories are general information about the crisis, specific information about recent events followed by the probability information and information about the possible consequences. The least popular categories are experiences of other people with the risk, information about who is responsible and general guidelines about what to do during a recession. It is not surprising that the latter category and the categories that include information about control and exposure to the risk are not the most popular as people realize that the financial economical crisis is not a type of risk that can

individually be controlled, so concrete guidelines and information about exposure controllability do not really add a lot of value to their mental models about the risk. We could state that in a sense, people are trying to construct their own risk realities by informing themselves about the general risk and keeping this information up to date, taking into account the possible effects on their personal lives. However, as they realize that they cannot control the risk because it is something that is too abstract and driven by invisible and uncontrollable forces. As general guidelines are hard to formulate and would come from higher order social institutes as the governments and financial institutes (IMF, National bank, …) people would not trust the guidelines anyway as they would perceive them to be in the best interests of these institutes rather than in the interest of the society as a whole. We will discuss the issues of trust and credibility later on in this report.

8. Identifying and profiling the public

The next research objective is the confirmation and validation of the information seeking segmentation and of the identification tool for opinion leaders.

8.1. Identification of opinion leaders

We used the classical traits of information seeking behaviour (active, passive and event triggered information seeking) and social behaviour, together with specific opinion leadership traits to cluster the information seekers. Originally, the specific opinion leadership item was limited to one specific trait, referring to influence:
"In conversations, my friends, colleagues, family… attach much importance to my opinion concerning the financial economical crisis."
However, we decided to add new items that measure opinion leadership in this study as we wanted to counter the critique that the single item approach was too narrow-minded. The new opinion leadership items were inspired by the existing opinion leadership scales of Flynn, Goldsmith and Eastman and Rogers and Cartano, as described in the theoretical body (L. R. Flynn et al., 1994, 1996; E. M. Rogers & Cartano, 1962). Naturally, we customized the items to the context of the financial economical crisis and translated the items into Dutch.
In order to determine the factorial structure of the concepts and to compute the internal consistency of the measurement scales, we tried to validate our theoretical assumptions regarding the dimensions of opinion leadership by means of a factor analysis. The calculation of the Cronbach's alpha values provided us with information about the internal scale reliabilities.

The subjoined table provides us with the information of the analyses.

Construct/items	Factor loadings			
Total variance explained: 66.12%	**I**	**II**	**III**	**IV**
Social Behaviour (talking to others) (α=0.83)				
When there is a news items about the fin/ec crisis, I will discuss it with others	,755			
I think it's important to have the possibility to talk to friends/family/colleagues… about the fin/ec crisis	,734			
When there has been a TV-program about the fin/ec crisis, it will be discussed in my personal environment	,727			
How often do you talk about the fin/ec crisis to the following (groups of) persons: friends	,718			
How often do you talk about the fin/ec crisis to the following (groups of) persons: family	,677			
How often do you talk about the fin/ec crisis to the following (groups of) persons: colleagues or fellow-students	,615			
Information seeking (α=0.87)				
When there is an item about the fin/ec crisis in the news, I will follow this item with more attention		,848		
When there is a news item about the fin/ec crisis, I will follow it with more attention		,846		
When I'm reading a newspaper, I will never skip the articles or information about the fin/ec crisis		,762		
When I hear that there's news about the fin/ec crisis, I will look for more information as quickly as possible		,720		
I explicitly look for information about the fin/ec crisis in the media		,684		
Opinion leadership traits (α=0.84)				
People think of me as a valuable source of information about the fin/ec crisis			,823	
My opinion influences people on what they do with their investments, money,			,761	
People ask me questions about the fin/ec crisis because I know a lot about it			,739	
My friends, colleagues, family… attach much importance to my opinion concerning topics about the financial economical crisis			,642	
Convincer (α=0.85)				
I like to convince people about my opinions				,861
I like to take the lead in a group				,844
I notice that I am sometimes an example for others				,764
I can make people change their minds by convincing them				,698
Note: Extraction Method: Principal Component Analysis. Eigenvalues>1. Rotation Method: Varimax. Missing values: cases excluded listwise.				

Table 96: Factor analysis (PCA with Varimax rotation) for the opinion leadership dimensions in context of the financial crisis

The factor analysis confirmed the dimensions that were found in the previous researches, but it added two new dimensions that included the opinion leadership items that were added. The output of the PCA factor analysis included two new dimensions, labeled by us as 'Opinion leadership traits' (α=0.84) and 'Convincer' (α=0.85). The next step was to perform the cluster analysis to confirm the segmentation.

8.1.1. Cluster analysis

We opted to perform a K – means cluster analysis as we already confirmed that there are four groups in the other empirical studies and as our sample consists of 1578 cases, it is not recommended to perform a hierarchical cluster analysis. Missing data were also casewise deleted. Besides the three basic clustering variables (active information search, passive information search and event triggered information search), we added the two new dimensions that were retrieved by means of the PCA factor analysis: the 'upgraded' opinion leadership sumscale (consisting of 4 items) and the 'convincer' scumscale (consisting of 4 items). The K-means cluster analysis with 6 clustering variables provided us with the subjoined cluster result.

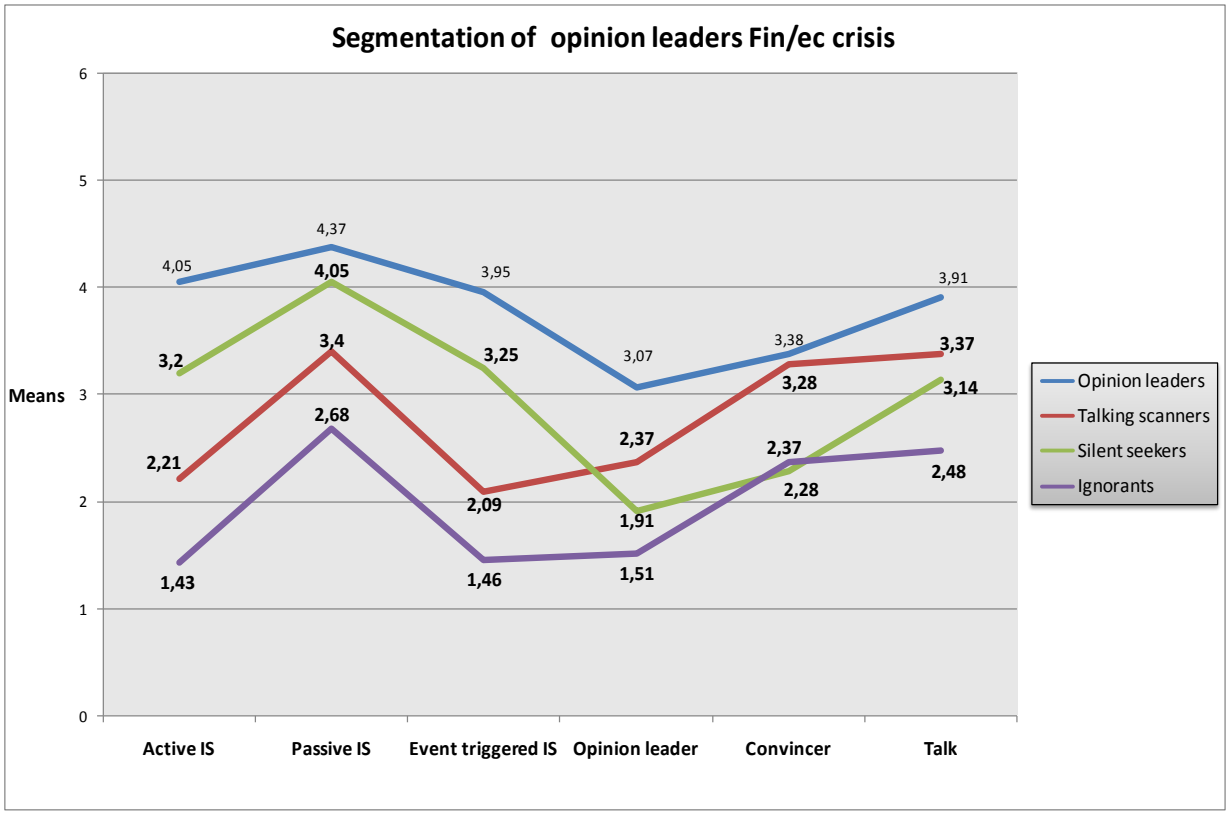


Figure 54: Segmentation of information seekers in the context of the financial crisis

Segment	%
Opinion leaders	25
Talking scanners	28
Silent seekers	24
Ignorants	24

Table 97: Overview of the presence of each cluster of information seekers in the context of the financial crisis

In the context of the financial economical crisis, based on our sample, 25% of the population can be labeled as opinion leaders.

	Analysis of Variance (file financiele crisis discr.sta)					
Variable	Between SS	df	Within SS	df	F	signif. p
actiefin	1431,779	3	652,0698	1489	1089,821	0,00
infocrisis	1382,537	3	628,4260	1489	1091,933	0,00
passinf	613,460	3	734,8538	1489	414,342	0,00
talk	382,866	3	614,3586	1489	309,313	0,00
opleader	488,336	3	522,7638	1489	463,646	0,00
convinc	379,525	3	771,4762	1489	244,169	0,00

Table 98: Analysis of variance (cluster analysis) in the context of the financial crisis

The analysis of variance is used to compare the means for each of the six dimensions between the four groups (taking into account the between and within group variance). We see that all means differ significantly from each other.
Other useful results to examine are the Euclidean distances between clusters These distances (Euclidean and squared Euclidean) are computed from the cluster means on each dimension.

	Euclidean Distances between Clusters (file Distances below diagonal Squared distances above diagonal			
Cluster Number	No. 1	No. 2	No. 3	No. 4
Silent seekers	0,000000	0,669203	0,747455	1,466749
Talking scanners	0,818048	0,000000	1,431592	0,647926
Opinion leaders	0,864555	1,196491	0,000000	3,572581
Ignorants	1,211094	0,804939	1,890127	0,000000

Table 99: Euclidean distances between the clusters in the context of the financial crisis

The table shows that the opinion leaders are closer to the talking scanners, but still the distances versus the other groups are quite high. Silent seekers and talking scanners are closest to each other.

1. **Opinion leaders.** This is the group of respondents who have the highest scores on all cluster variables. Their information seeking behaviour is high (active, passive and event triggered search), they consider themselves as opinion leaders and convincers in general and they talk more about terrorism to other people than the other groups. The percentage of opinion leaders in the context of the financial crisis is 25%.
2. The second group is the group of **silent seekers.** Their active, event triggered and especially their passive information search is above average. However, they only score averagely on social behaviour and they score low on the opinion leadership and convincer variables. The data revealed that 24% of the respondents are silent seekers.
3. The third group is the group of **talking scanners.** This group is characterized by its rather high passive information search behaviour, but low active and event triggered information search. They have a rather high score on social behaviour and the general 'convincer' variable but a rather low score on the opinion leadership variable. He analysis pointed out that 28% of the respondents are talking scanners.
4. The last group is the group of ignorants. These people generally score low on all variables. They are not interested in the bird flu, they do not talk about it and do not consider themselves as opinion leaders. They are no primary and even no secondary target group as they do not look for or retrieve information about terrorism neither do they talk about the subject. The percentage of respondents in this category is 24%.

8.1.2. Discriminant analysis

By means of the discriminant analysis, we will cross-check our segmentation. Hair et al. determined four main purposes of discriminant analysis (Hair et al., 1998):

We performed the discriminant analysis to determine whether the differences between the average score profiles of two or more groups (in our case 4 groups of information seekers) on a set of variables (here 6 variables) are statistically significant, to determine which one of the 6 independent variables in the analysis account the most for the differences in the average score profiles of the four groups and to establish the number and composition of the discriminating dimensions between the four groups from the set of independent variables.

8.1.2.1. Assessing the overall fit of the proposed model

Wilks' Lambda is **0.10**; F (18.42)= 289.35 ($p<0.000$), so the low Wilks' Lambda proves that the between-groups dispersion is large compared to the within groups dispersion. The four groups differ significantly and the six independent variables are discriminant items.
The **Wilks' Lambda's** which are mentioned in the first column of the output, refer to the Wilks' Lambda for the overall model that will result after removing the respective variable.

None of the Wilks' lambda's exceed 0.127. So each one of the independent variables contribute to the discrimination.

The **Partial Lamda's** in the second column are associated with the unique contribution of the respective variable to the discriminatory power of the model. The value (that ranges from 0 to1) has to be as high as possible. We can read that the partial lamda's range from 0.808 to 0.900, so they are all very high.

The **F-remove** values are associated with the respective partial Wilk's Lambda's and the **p-levels** indicate the significance levels of the F values.

The **Tolerance** values are in fact the results of 1-r^2 of the respective variable with all other variables in the model as shown in the output. It is a measure of the redundancy of the respective variable. Naturally, 1-Tolerance is the r^2 of the respective variable with all other variables in the model/output. The miminum r^2 (0.015) is the one of the variable **talk**. Its Tolerance value is 0.98, which means that the variable **talk** is 5% redundant with the other variables. The highest r^2 is 0.129 (Tolerance=0.87), which means that 13% of the variable **infocrisis** is explained by the other five variables in the model.

	Discriminant Function Analysis Summary (Spreadsheet14) No. of vars in model: 6; Grouping: CLUSTER (4 grps) Wilks' Lambda: ,10208 approx. F (18,4197)=289,35 p<0,0000					
N=1493	Wilks' Lambda	Partial Lambda	F-remove 3,1484	p-level	Toler.	1-Toler. (R-Sqr.)
actiefin	0,125796	0,811506	114,8997	0,00	0,876080	0,123920
infocrisis	0,126205	0,808879	116,8792	0,00	0,870726	0,129274
passinf	0,113392	0,900277	54,7940	0,00	0,950405	0,049595
talk	0,116115	0,879163	67,9895	0,00	0,984987	0,015013
opleader	0,116515	0,876146	69,9272	0,00	0,904993	0,095007
convinc	0,119641	0,853255	85,0743	0,00	0,892070	0,107930

Table 100: Discriminant function analysis summary in the context of the financial crisis

8.1.2.2. Assessing groups membership prediction accuracy

The **classification matrix** contains information about the number and percent of correctly classified cases in each group. The subjoined classification matrix shows us that more than 97% of the cases are correctly assigned to the predicted groups. For the most important group in our research, the opinion leaders, this percentage is almost 99%.

Group	Classification Matrix (Spreadsheet14) Rows: Observed classifications Columns: Predicted classifications Percent Correct	Silent seekers p=,23778	Talking scanners p=,27662	Opinion leaders p=,24849	Ignorants p=,23711
Silent seekers	94,92958	337	10	2	6
Talking scanners	98,30508	2	406	4	1
Opinion leaders	98,92183	4	0	367	0
Ignorants	96,32768	0	13	0	341
Total	97,18687	343	429	373	348

Table 101: Classification matrix in the context of the financial crisis

Now that we have identified the opinion leaders by means of our clustering tool, we can construct their specific socio-demographical and media profile.

8.1.3. Profiling opinion leaders

We will first create both the general socio-demographical profiles as the mediaprofiles of all four groups of information seekers. Secondly, we will focus on the specific information needs of the opinion leaders, as this group of people will play a key role in our risk communication strategy.

Socio-demographical profile

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Gender	**70% male**	50% male	44% male	39% male
	30% female	50% female	56% female	61% female
	X^2=79.58, p<0.000 (0% Fe<5, min.Fe=174.04)			
Age (mean)	**45.39**	38.53	50.72	41.21
	F(3,1489)=34.87, p<0.000			
Educational level	10% low	9% low	26% low	19% low
	32% average	33% average	34% average	35% average
	58% high	58% high	41% high	46% high
	X^2=61.21, p<0.000 (0% Fe<5, min.Fe=55.27)			
Income level	**17% <1000€**	32% <1000€	23% <1000€	36% <1000€
€ net / month	**61% 1000€-2500€**	57% 1000€-2500€	70% 1000€-2500€	61% 1000€-2500€
	22% >2500€	11% >2500€	7% >2500€	3% >2500€
	X^2=96.71, p<0.000 (0% Fe<5, min.Fe=36.85)			

Table 102: Socio-demographical profile of the information seekers in the context of the financial crisis

As we can derive from the data in the table above, the opinion leaders in the context of the financial crisis are very dominantly male (70% versus 30% female). The average age is 45 years old and they have higher educational levels. A very important difference is that the percentage of people with a high income is greater within the opinion leaders category (22% has a net income of more than 2500€/month) than within the other groups (% ranges from 3% to 11%). Remarkable as well is that the ignorants are mainly female (61%) with lower incomes (36% has a net income of less than 1000€/month).
Besides the socio-demographical profiles of the clusters, we gain much information from the perception profiles that integrate the key constructs of risk perception in the context of the financial crisis.

Perception profiles

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Mental distance	**1.48**	1.84	1.71	2.11
	*F(3,1484)=59.40****			
Risk perception	**3.95**	3.76	3.78	3.68
	*F(3,1478)=11.77****			
Fear	**2.51**	2.37	2.59	2.23
	*F(3,1431)=11.72****			
Behaviour	**1.70**	1.60	1.61	1.47
	*F(3,1484)=5.68***			
Need for information	**3.95**	3.29	3.55	2.91
	*F(3,1473)=121.43****			
Information sufficiency	**3.04**	2.62	2.43	2.26
	*F(3,1482)=47.98****			

Table 103: Perception profiles of the information seekers in the context of the financial crisis

The opinion leaders differ significantly from the other groups of information seekers on various constructs. They have the lowest score for mental distance towards the risk and they have the highest mean for risk perception. Even though they have an average level of fear (mean of 2.51 on 5 point scale), they don't have the highest level of fear (silent seekers have a mean of 2.59 for this construct). The overall levels of behaviour are low (1.70 on 5 point scale) but the opinion leaders do have the highest mean (1.70). As expected, they also have the highest level of information need (3.95) and information sufficiency (3.04). We may conclude by stating that opinion leaders have the highest risk perception values but they are not more afraid than the other groups. They do have an outspoken information behaviour.

Media profiles of target groups (opinion leaders)

	Opinion leaders	Talking scanners	Silent seekers	Ignorants
Television	**98.71**	99.58	125.45	114.96
	*F(3,1485)=11.36****			
Internet	**329.41**	339.55	216.22	309.99
	*F(3,1470)=1.9**			
Media usage %regularly-often-always	**Websites (67%)** **Online forums(16%)** **De Standaard (41%)** **De Tijd (33%)** **Één (92%)** **Canvas (76%)** **Kanaal Z[6] (35%)**	Websites (26%) Online forums(2%) De Standaard (27%) Één (78%) Kanaal Z (6%)	Websites (29%) Online forums(5%) HLN (28%) Één (82%) Kanaal Z (16%)	Websites (11%) Online forums(5%) HLN (19%) Één (62%) Kanaal Z (2%)

Table 104: Media profiles of the information seekers in the context of the financial crisis

The opinion leaders also have an outspoken media profile. They do not watch television as much as the other groups but their general internet usage is rather high. A larger percentage consults websites and online forums for information concerning the financial crisis. They mainly read De Standaard and De Tijd (specific newspaper with much financial and economical news). The vast majority watches Eén, Canvas (public television channels) and Kanaal Z. We notice that the opinion leaders mainly consult very specific and mainly 'quality' news sources to retrieve their information about the risk of the financial and economical crisis. The subjoined overview will summarize the profile of the opinion leaders.

Opinion Leader Profile

Male > Female

Average age: 45 years old

Mainly higher educated

Lower mental distance, higher risk perception

Higher need for risk information and feeling of risk information control

Media profile: Average tv viewers and moderate Internet users, however they consult websites and forums significantly more to look for crisis risk information. Higher consumption of De Tijd and De Standaard. They primarily watch één, Canvas and Kanaal Z (sig. more than other groups).

Table 105: General profile opinion leaders in the context of the bird flu

[6] 'Kanaal Z' is a specific tv channel that focuses on financial news. 'De Tijd' is a newspaper that also puts a lot of attention to the financial field.

The next section will discuss the specific risk information needs of the opinion leaders.

Risk information needs of opinion leaders

Risk info nature	How often do you look for the following type of information		Mean score/10	St.Dev.	% score ≥7/10
	% rarely/never	% often/always			
Info about the probability that the financial economical crisis will become more severe	3	56	7.7	1.8	66
General information about the financial/economical crisis	1	57	8	1.5	86
Specific info about recent events in the financial sector (banks/)	1	62	8.2	1.5	89
Info about the controllability of the risk	8	44	7.3	1.9	70
Info about exposure to the risk	4	49	7.6	1.7	77
Info about the consequences of a financial/economical recession	3	53	7.8	1.6	85
Guidelines about what to do during a financial/economical recession	17	38	6.8	2.2	61
Info about who's responsible	14	23	6.6	2.3	66
Experiences of other people with the risk	20	25	6.3	2.2	50

Table 106: Risk information needs of the opinion leaders in the context of the financial crisis

Opinion leaders have higher scores on these items in general. Their preferred type of risk information is also general information, information of recent events and info about the consequences but they also look for information about the probability of the risk. They think that these kinds of information are important (score >7), but also think that information about the controllability and exposure to the risk is important. Least important for them are the general guidelines, info about who's responsible and experiences of other people.
In the next paragraph, we will discuss the descriptive and specific results for opinion leaders about the perceptions of the government and governmental communication.

9. Governmental communication descriptive statistics

In this block, we will discuss the perceived roles of the government, trust in the institutes, the perceived governmental information flow control, the general perception of governmental information and the evaluation of the communication channels.

9.1. Perceived roles of the government

Measured on a 6 point Lickert scale (1=Totally not important-6=Extremely important)

	Mean	St.Dev.	Age	% Low	% High
Protecting the population against the crisis by taking concrete measures					
Non-OL	5.32	0.80		1	87
OL	5.49	0.71		1	91
	*t(1489)=-3.50****				
Providing concrete guidelines to civilians			<35 year = 4.84 35-44 year = 4.96 45-64 year = 5.04 >64 year = 4.96		
Non-OL	4.89	0.87	*F(3,1570)=5.18***	1	73
OL	5.08	0.86		1	78
	*t(1490)=-3.73****				
Providing general information about the financial economical crisis			<35 year =4.94 35-44 year = 4.91 45-64 year = 5.06 >64 year = 4.95		
Non-OL	4.91	0.81	*F(3,1572)=2.96**	1	74
OL	5.15	0.79		1	85
	*t(1490)=-4.75****				
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001				

Table 107: Perceived roles of the government in the context of the financial crisis

In general, people attach high importance to the three roles that were proposed: protecting the population, providing concrete guidelines and providing general information. Means are high and the percentages important/extremely important are very high. The most important role remains protecting the population by taking concrete measures. We also notice that opinion leaders score significantly higher on all roles and there are no differences for gender and no striking difference for age categories.

We can conclude that people do think that the role of the government as a risk communicator is almost as important as the risk regulator role.

9.2. Trust in institutes as risk communicators

We wanted to compare various sources of risk information concerning their reliability. Measured on a 5 point Lickert scale (1=Do not trust this source at all-5=totally trust this source)

Degree of trust in following instances when they communicate about crisis						
Source	**Mean**	**St.Dev.**	**Gender**	**Age**	**% Low**	**% High**
Experts				<35 year = 3.80 35-44 year = 3.60 45-64 year = 3.64 >64 year = 3.58		
Non-OL	3.71	0.80		*F(3,1566)=6.39****	8	72
OL	3.62	0.83			10	70
Prime minister			Male = 2.87 Female = 3.03 *t (1574)=-3.05***	<35 year = 2.94 35-44 year = 2.82 45-64 year = 2.90		
Non-OL	2.99	0.95		>64 year = 3.19	29	33
OL	2.81 *t(1489)=3.21***	1.03		*F(3,1572)=6.75****	37	27
Minister of finance			Male = 2.56 Female = 2.73 *t (1573)=-3.45***	<35 year = 2.83 35-44 year = 2.66 45-64 year = 2.50 >64 year = 2.54		
Non-OL	2.68	0.98		*F(3,1571)=11.38****	39	20
OL	2.56 *t(1490)=2.16**	1.03			46	20
CEO's of banks			Male = 2.12 Female = 2.28 *t (1573)=-3.46***	<35 year = 2.23 35-44 year = 2.31 45-64 year = 2.08 >64 year = 2.26		
Non-OL	2.22	0.94		*F(3,1571)=4.38***	64	10
OL	2.17	1.01			66	13
Media				<35 year = 3.11 35-44 year = 3.00 45-64 year = 3.08 >64 year = 2.83		
Non-OL	3.05	0.85		*F(3,1568)=6.54****	23	31
OL	3.01	0.91			25	32
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 108: Trust levels in governmental risk communication about the financial crisis

The most trusted sources of risk information are the experts, followed by the media and the prime minister. The minister of finance scores averagely. CEO's of banks are perceived to be not trustworthy (mean score below 2.5). Opinion leaders significantly have lower trust scores on the minister of finance and the prime minister, they are more critical towards these sources of information. Women generally have significantly higher trust scores, except for the experts and the media. There are also some significant differences between the age categories: the media and experts are trusted most by the youngest age category, the prime minister by the oldest age group. We sense a certain distrust in the governmental officials (prime minister and minister of finance). In the next table, we verify how people perceive the domination of the information flow by the government.

9.3. Governmental control of information flow

We tried to expose the perceptions about the government as a risk information broker. Do people perceive the government to be in total control of the information flows? Do they approve this? Do they think that they know as much as the government does? The statements had to be answered on a 5 point Lickert scale (1=totally do not agree-5=totally agree).

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Information control government						
Non-OL	3.45	1.00			19	57
OL	3.54	1.14			20	61
We know everything that the government knows						
Non-OL	1.47	0.71			92	2
OL	1.47	0.72			93	2
Approval of government as selective info diffuser				<35 year = 2.64 35-44 year = 2.63 45-64 year = 2.75 >64 year = 2.92		
Non-OL	2.74	1.11		*F(3,1571)=4.26***	46	29
OL	2.64	1.21			52	30
Critical about govinfo			Male = 3.88 Female = 3.73 *t (1575)=3.65****	<35 year = 3.77 35-44 year = 3.82 45-64 year = 3.94 >64 year = 3.61		
Non-OL	**3.72**	0.85		*F(3,1573)=8.67****	9	72
OL	**4.08** *t(1491)=-7.17****	0.86			7	83
Need for participation				<35 year = 2.37 35-44 year = 2.61 45-64 year = 2.87 >64 year = 2.67		
Non-OL	**2.48**	1.01		*F(3,1573)=19.84****	47	20
OL	**2.95** *t(1490)=-7.50****	1.15			35	34

Significance key * p≤0.05 ** p≤0.01 *** p≤0.001

Table 109: Perceptions about governmental risk information flows in the context of the financial crisis

In general, people perceive the government to be in control of the information that is being spread (means are high, high percentages of agreement). Only two percent thinks that they know as much as the government does (92% does not believe this so people have a pronounced opinion about this statement). The average score on the approval of the government as a selective info diffuser does not offer us a great deal of information,

however, almost 50% of the people do not think it is a good thing that the government is selective in their information diffusion whereas 30% approves. We notice that the oldest age category have significantly higher scores on this statement. People state that they are rather critical about governmental information, and men agree more with this than women, as well as the category of 45-64 years does. Opinion leaders are also more critical than the other groups. The need for active participation in the communication with the government is moderate, except for the opinion leaders, who score higher on this issue (as well as the group of 45-64 years, where the opinion leaders are located). We will now describe the general perception of the governmental communication.

9.4. General trust and general perception of governmental communication

We will discuss the general trust in the government as a risk regulator and the quality, quantity and reliability of the governmental information about the financial economical crisis.

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
General trust in government			Male = 2.88 Female = 2.97 *t (1560)=-2.57****	<35 year = 3.02 35-44 year = 2.88 45-64 year = 2.83 >64 year = 2.97		
Non-OL	**2.96**	0.62		*F(3,1558)=8.05****	42	4
OL	**2.83** *t(1480)=3.14***	0.75			51	6
Quality of govinfo			Male = 2.79 Female = 2.88 *t (1575)=-2.1**	<35 year = 2.94 35-44 year = 2.80 45-64 year = 2.72 >64 year = 2.88		
Non-OL	**2.89**	**0.85**		*F(3,1570)=6.25****	34	24
OL	**2.69** *t(1488)=3.74****	**0.93**			48	24
Quantity of govinfo				<35 year = 2.94 35-44 year = 2.76 45-64 year = 2.65 >64 year = 2.80		
Non-OL	**2.85**	**0.86**		*F(3,1568)=9.77****	53	20
OL	**2.63** *t(1486)=4.16****	**0.93**			65	17
Reliability of govinfo						
Non-OL	**2.94**	**0.90**			35	31
OL	**2.80** *t(1485)=2.53**	**1.03**			38	32
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001					

Table 110: Trust and perception of general governmental communication in the context of the financial crisis

When we look at the means, the general trust in the government as a risk regulator is moderate, with opinion leaders having a significantly lower trust level. The same accounts for the perceived quality, quantity and reliability of the governmental information about the crisis. Opinion leaders have significantly lower means than the others. When we look at the percentages, more people have negative scores than people who have positive scores on the five point scale, especially for the general trust, only 4% has a high trust level. Concerning the other concepts, the percentage of people who have positive scores on perceived quality, quantity and reliability varies from 20% to 30%, which is not satisfactory at all. Especially for the perceived quantity of information, 50% to 65% (opinion leaders) are not satisfied. However, we notice that for most of the constructs, the percentage of people that answers neutrally varies from 28% to 54%. Especially for the general trust in the government construct, half of the respondents answered neutrally. This means that for these issues, people do not always have an outspoken opinion. Again, this could be explained by the low involvement or interest of a large portion of the respondents. However, for opinion leaders, these percentages of neutral answers are lower. Especially concerning the quality and quantity of governmental information about the financial and economical crisis, the opinion leaders have very outspoken opinions that are rather negative.
From these facts we may conclude that the general image of the government as a risk information broker is not positive or satisfactory at all. Especially for the fragile group of opinion leaders, who are key components in our risk communication strategies, there have to be concrete actions to jack up the satisfaction with the amount, quality and reliability of governmental information.

9.5. Evaluation of governmental communication channels

The last table will describe the evaluation of the governmental communication channels.
Measured on 6 point Lickert scales (1=totally not - 6 = Absolutely)

Communication channel	Mean	St.Dev.	% Low	% High
Tv advertisements				
Non-OL	**2.66**	1.38	47	9
OL	**2.45**	1.33	51	7
	*t(1465)=2.50**			
Website				
Non-OL	3.74	1.12	14	**23**
OL	3.95	1.06	11	**33**
	*t(1463)=-3.19***			
Brochure				
Non-OL	3.59	1.11	16	20
OL	3.54	1.15	19	18
Hotline				
Non-OL	3.37	1.26	24	17
OL	3.31	1.22	25	16

Printmedia				
Non-OL	3.57	1.13	17	21
OL	3.54	1.19	19	23
Media in general				
Non-OL	4.40	0.80	3	51
OL	4.47	0.82	4	59
Experts				
Non-OL	**3.85**	1.12	12	**31**
OL	**4.16**	0.99	8	**43**
	*t(1438)=-4.55****			

Table 111: Evaluation of governmental risk communication channels in the context of the financial crisis

The communication channels that are perceived to be most appropriate to communicate with the people are the media in general, experts and websites (official website). These channels have rather moderate to higher means and a rather high percentage of people that agrees. However, we might state that there are a lot of people who do not have a pronounced opinion about this matter. Opinion leaders prefer experts and websites (significantly higher scores) but condemn TV ads as communication tools.
Besides the general descriptive statistics, we also wanted to correlate the key concepts in order to discover linear relationships. The next tables will go into this matter.

10. Multivariate analyses

We decided to perform the correlations both for the non-opinion leaders as for the opinion leaders, as we assume that some correlations might be stronger for opinion leaders than for non-opinion leaders.

10.1. Correlations

In the subjoined tables, the correlation results are integrated. We will first present the two tables: the correlations of the general concepts and the correlations of the governmental information related concepts. The results will be discussed in the next paragraph.

	Mental distance		Risk perception		Fear		Behaviour		Info need		Info seeking		Info Sufficiency		Talk	
	Non OL	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***
Mental distance																
Risk perception	**-0.30*** **	***-0.17*** **														
Fear	-0.14***	*-0.03*	**0.25*** **	*0.33*** *												
Behaviour	-0.02	*-0.02*	0.09***	*0.09*** *	**0.31*** **	***0.31*** **										
Info need	**-0.26*** **	***-0.22*** **	**0.20*** **	***0.21*** **	**0.21*** **	***0.21*** **	0.14***	*0.15*** *								
Info seeking	**-0.31*** **	***-0.16*** **	0.13***	*0.22*** *	0.16***	*0.11**	0.11***	*0.08*	**0.46*** **	***0.30*** **						
Info sufficiency	0.007	*0.05*	-0.06*	*-0.08*	-0.14***	***-0.23*** **	-0.02	*-0.06*	-0.13***	***-0.28*** **	0.06	*0.06*				
Talk	**-0.32*** **	***-0.27*** **	**0.24*** **	***0.13** *	0.08***	*0.02*	0.08**	*0.10*	**0.34*** **	***0.18*** **	**0.29*** **	***0.13*** **	0.06*	*-0.04*		
Trust	0.08***	*0.21*** *	-0.16*	*-0.22**	-0.11***	*-0.13**	-0.05	*-0.05*	**-0.27*** **	***-0.34*** **	-0.06*	*-0.14***	0.08**	*0.10*	-0.01	*-0.11*
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001															

Table 112: Correlations general concepts in the context of the financial crisis

	Quality govinfo		Quantity govinfo		Reliability govinfo		Trust		Info need		Info seeking		Info sufficiency		Talk	
	Non OL	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***	**Non OL**	***OL***		
Quality govinfo																
Quantity govinfo	**0.55*** **	***0.66*** **														
Reliability govinfo	**0.50*** **	***0.59*** **	**0.50*** **	***0.59*** **												
Trust	**0.53*** **	***0.68*** **	**0.53*** **	***0.60*** **	**0.54*** **	***0.61*** **										
Info need	**-0.32*** **	***-0.44*** **	**-0.39*** **	***-0.42*** **	**-0.25**	***-0.33*** **	**-0.27*** **	***-0.34*** **								
Info seeking	-0.11***	*-0.13**	-0.16***	*-0.09*	-0.10**	*-0.10*	-0.06*	*-0.14***	0.46***							
Info sufficiency	0.13***	*0.16*** *	0.14***	*0.19*** *	0.08**	*0.12*	0.08**	*0.10*	-0.13**	***-0.28*** **	0.06	*-0.01*				
Talk	-0.04	*-0.07*	0.006	*-0.06*	-0.02	*-0.05*	-0.01	*-0.11**	**0.34*** **	***0.18*** **	**0.29*** **	***0.13*** **	0.06*	*-0.04*		
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001															

Table 113: Correlations governmental communication concepts in the context of the financial crisis

10.2. Correlations general concepts

There are some evident negative linear relationships like the positive correlation between mental distance and risk perception (r=-0.30) and info need and info seeking (r=0.46). The correlation tables reveal strong relationships between trust and information need (r=-0.27), which means that the more people feel that they need information, the lower their general trust in the governments as a risk regulator (and vice versa). This relationship is even stronger for opinion leaders (r=-0.34). There is also a relatively strong negative relationship between the mental distance and information seeking behaviour (r=-0.31) which indicates that the lower the mental distance, the more people will look for information about the risk. This correlation is weaker for opinion leaders, probably because of the fact that they already have very low mental distances and high information seeking levels. Same accounts for the relationship mental distance and social behaviour (talk). People with low mental distances talk more to other people (r=-0.32, opinion leaders r=-0.27). More important are the positive correlations between fear and behaviour and fear and information need (respectively r=0.31 and r=0.21). So people who are more afraid will take more concrete actions (withdrawing money etc.) and will have a greater need for information and vice versa. For opinion leaders, we have discovered a statistically significant negative linear relationship between fear and information sufficiency (r=-0.23 compared to r=-0.14 for the others) which means that the more opinion leaders have the feeling that they have achieved a satisfactory level of information about the risk, the less frightened they are.

10.3. Correlations governmental information

There are strong positive linear relationships between information quantity, quality and reliability, the correlation coefficients between these concepts all vary between 0.50 and 0.55 and they are significant at the 0.001 level. There is also a very high correlation with the general trust in the government. This means that it is absolutely necessary to provide enough and qualitative information because these concepts do not only correlate strongly with each other but also with the perceived reliability of the information and the general trust in the government. The correlations between the concepts are even stronger for opinion leaders (correlation coefficients vary from 0.59 to 0.68).
We will try to validate these multivariate relationships in three structural equation models.

10.4. Structural equation models

10.4.1. Relationship government as a risk communicator and risk regulator

Prior to further analysis, some summary variables were constructed. The following table explains the variables used in the proposed SEM models and gives, where necessary, the cronbach's alpha value that measures the internal consistency of the scale (value should exceed 0.70).

Construct	N	Items	α
Quantity govinfo	**3**	The Belgian government provides us with a sufficient amount of information about the fin/ec crisis The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of the fin/ec crisis To what degree do you thing that the Belgian government offers a sufficient amount of information about the fin/ec crisis?	**0.81**
Quality govinfo	**1**	The quality of the governmental information about the fin/ec crisis is good	
Reliability govinfo	**1**	To what degree do you think that information coming from the Belgian government about the fin/ec crisis is reliable?	
General trust in government *Perceived preparedness gov* *Gov measures to protect economy* *Trust in gov as protector of economy*	**5**	How much trust do you have in the prime minister when he says something about the fin/ec crisis? How much trust do you have in the minister of finance when he says something about the fin/ec crisis? *To what extent do you perceive the Belgian government as being prepared for the fin/ec crisis?* *The government is taking enough measures to protect the population during the fin/ec crisis* *I trust the government that they will protect the civilians during the fin/ec crisis*	**0.71**
Negative perception participation	**1**	Civilians do not have the possibility to communicate with the government about the fin/ec crisis	
Need for participation (communication)	**1**	I feel the need to communicate with the government about the fin/ec crisis	
Opinion leadership	**6**	Passive information scanning Active information seeking Event-triggered information seeking Talk Convincer Opinion leadership traits	**0.81**

Table 114: Cronbach's alpha values of the governmental communication related constructs in the context of the financial crisis

Structural equation modelling (SEM) procedures were used to test the plausibility of the postulated models. Amos, a statistical software package for SEM was used to estimate the

parameters. The chi-squared p- value should exceed 0.05, however, with large samples, this value is not reliable. To counter this, we performed chi-square analyses on a random, small sub-sample (approx. 10% of the sample) of 100 and 150 respondents. The use of chi-square is appropriate for sample sizes between 100 and 200 (Hair et al., 1998). All other analyses were performed on the full sample (n=1558). The model fit was assessed by means of the Comparative Fit Index (CFI), the Normed Fit Index (NFI), the Tucker-Lewis Index (TLI). The values of these Goodness of Fit measures should exceed 0.90 (Hair, Anderson, Tatham & Black, 1998). The Root Mean Square Error of approximation (RMSEA) was calculated. Values from 0.05 to 0.08 are deemed acceptable, but are preferable less than 0.05.

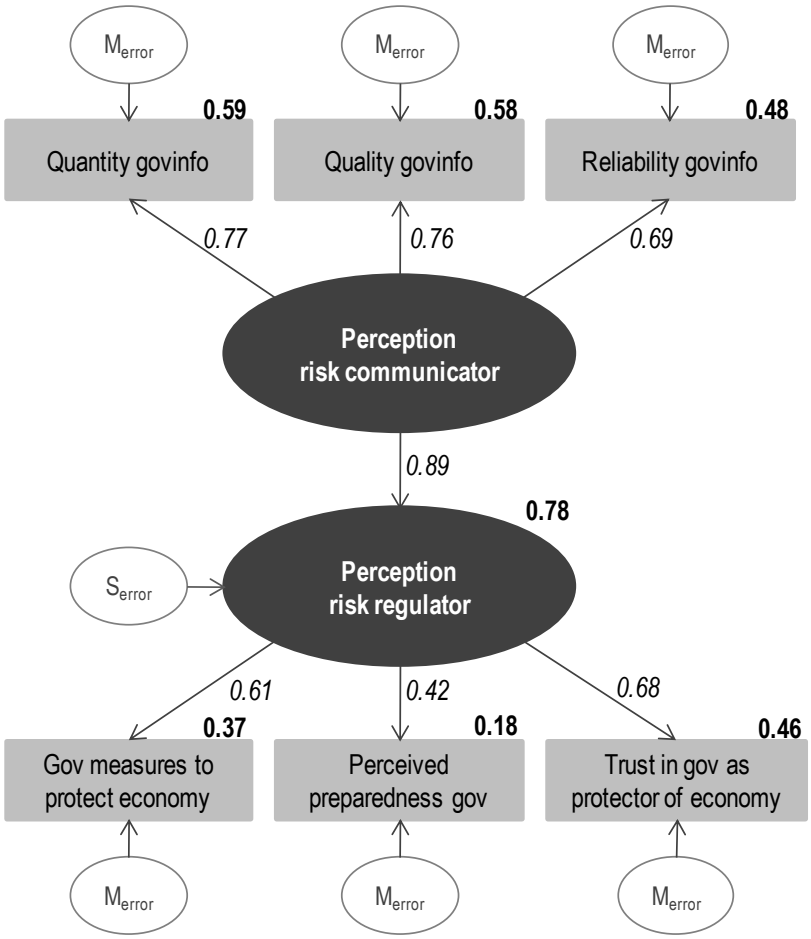


Figure 55: SEM integrating the relationship between the perceptions of the government as a risk regulation and as a risk communicator in the context of the financial crisis

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Financial crisis	91.11/8/0.000	9.16 / 8 / 0.33	0.97	0.97	0.92	0.08

Table 115: Overview of the general parameters of fitness of the basic SEM model in the context of the financial crisis

This model depicts the relationship between the satisfaction with the government as a risk communicator and the satisfaction with the government as a risk regulator. The chi-squared p value for the full sample was smaller than 0.001. When we performed the analysis on a random sample of 100 cases, the chi-squared p-value was 0.33 (random sample of 150

cases, p=0.09), which proofs that the actual and the predicted input matrices are not statistically different. This means that the proposed model fits the observed covariances and correlations well. The NFI, CFI and TLI values all exceed the critical value of 0.90 and the RMSEA value (0.08) is acceptable. The perception of the government as a risk communicator is a latent variable that is measured by the three manifest variables: satisfaction with the quantity and quality of the governmental information about the financial/economical crisis and the perceived reliability of the information provided by the government. The regression weights (standardized beta values, marked in *italic*) of these three variables are all very high and the satisfaction with the quantity of governmental information has the largest weight in the prediction of the perception of the government as a good risk communicator (beta=0.77, p<0.001), followed by quality of governmental information (beta=0.76, p<0.001) and reliability of governmental information (beta=0.69, p<0.001). The perception of the government as a risk regulator is a latent variable, measured by three manifest variables. The trust in the government as a protector of our economy is the most important predictor (beta=0.68, p<0.001), followed by the satisfaction with governmental measures to protect our economy (beta=0.61, p<0.001). The perceived preparedness of governmental services is the weakest predictor (beta=0.42, p<0.001). The most important conclusion from this analysis is that the total amount of explained variance in the perception of the government as a risk regulator by the perception of the government as a risk communicator is 78%, which is very high (beta=0.89, p<0.001).

10.4.2. Linking the perception on possibilities of participation in communication

In a second phase, we added the variable that measures how strongly people agree with the statement that citizens get the possibility to communicate with the government about the financial and economical crisis. This reflects their view on the possibility of bottom-up communication. After testing diverse models, a nice result was found when we linked this item directly to the perception of the government as a risk communicator. The chi-squared p-value (0.09 for n=100), goodness-of-fit measures (NFI, CFI, TLI >0.90) and the RMSEA value (0.06) all proof that the model is good. We found a quite strong negative relationship between the latent variable perception risk communicator and negative perception participation (beta=-0.22, p<0.001), however only 5% of the variance in the latter is explained by the latent variable.

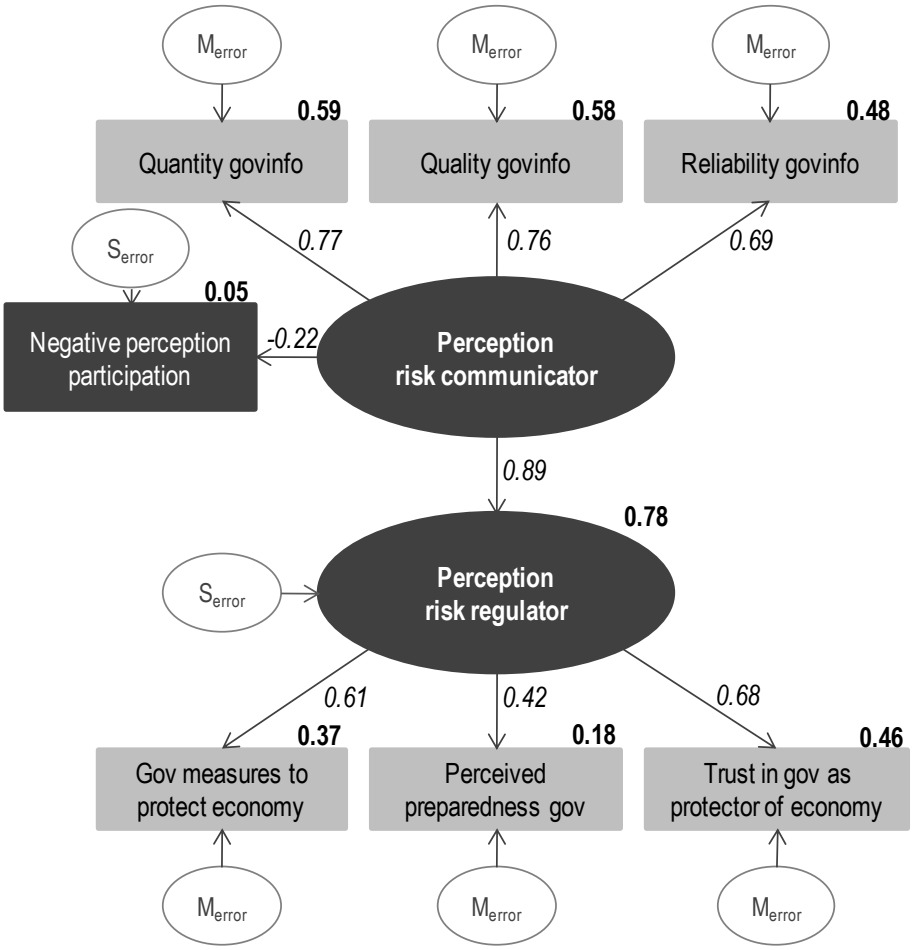


Figure 56: SEM linking the perception of possibilities of participation to the basic model in the context of the financial crisis

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Financial crisis	101.6/13/0.000	20.44 /13/0.09	0.96	0.97	0.93	0.06

Table 116: General parameters of fitness of the SEM model linking participation to the basic model in the context of terrorism

So we can say that the more people are satisfied with the government as a risk communicator, the less they will think that there is no possibility for bottom-up communication. The next step was to determine whether the need for bottom-up communication correlates with the satisfaction with the government as a risk communicator, taking into account the opinion leadership principle.

10.4.3. Incorporating the need for bottom-up communication and opinion leadership

A last variant of the model integrates the need for communication with the government about terrorism and the concept of opinion leadership. As mentioned before, the opinion

leadership concept is measured by six elements, as described in the factor analysis. Again, the chi-squared p-value (0.16 for n=100), goodness-of-fit measures (NFI, CFI, TLI>0.90) and the RMSEA value (0.06) all proof that the model is good. The results show us that the satisfaction with the government as a risk communicator has a negative causal relationship with the need for bottom-up communication (beta=-0.25, p<0.001) which means that the more people are satisfied with the government as a communicator, the less they will feel the need to communicate with the government about terrorism themselves. We can also state that the opinion leadership concept has a quite strong positive causal relationship with the need for bottom-up communication (beta=0.31, p<0.001) which means that the higher people rate on opinion leadership, the more they will feel the need to exchange knowledge with the government about terrorism. Opinion leadership and satisfaction of the government as a risk communicator together explain 16% of the variance within the variable that measures the need for bottom-up communication.

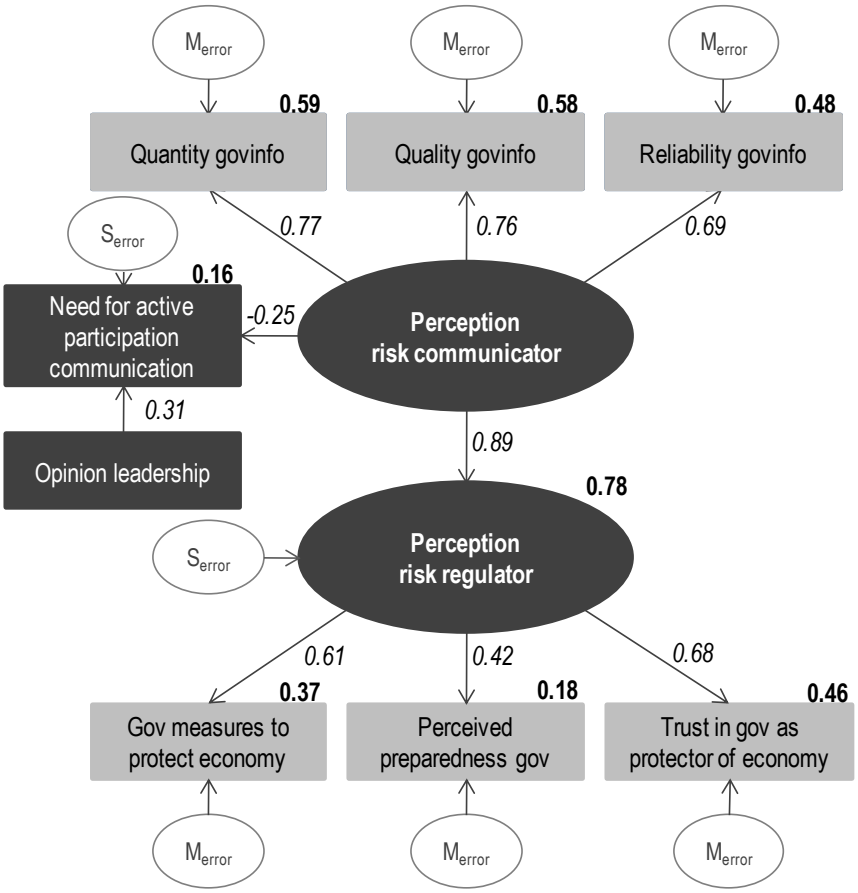


Figure 57: SEM linking bottom-up communication and opinion leadership in the context of the financial crisis

Study	Chi²/df/p	Chi²/df/p for n =150	NFI	CFI	TLI	RMSEA
Financial crisis	101.6/13/0.000	20.44 /13/0.09	0.96	0.97	0.93	0.06

Table 117: General parameters of fitness of the SEM model linking bottom-up communication and opinion leadership in the context of the financial crisis

So for governments, it is important to communicate effectively, but also to determine who those opinion leaders are and how they can be reached, because this group of people that is characterized by a high level of influence on other social groups within society and an extensive information searching behaviour will feel the need to communicate about the financial and economical crisis.

11. Conclusion study financial economical crisis

This third research report summarized the results of a large scaled quantitative survey study (n=1578) that had three main objectives. First we aimed at the validation and confirmation of the general measurement scales that have been developed to construct a risk perception 'methodology' and deliver a full and comprehensive descriptive report on the descriptive of the central concepts in our risk management strategies in the context of the financial economical crisis, including risk perception, mental distance, fear levels, specific behavioural intentions, information seeking behaviour and trust in the government. Secondly, we wanted to confirm the information seeking segmentation and validation of the tool to identify opinion leaders in the context of the financial and economical crisis as a risk. We also wanted to know whether the initial set of segmentation concepts could be improved by adding some more items. The third objective was to scrutinize the multivariate relationships between the key concepts about risk perception.

The descriptive statistics in the comprehensive report confirmed the assumptions that were made based on the first quantitative research studies. For the key concepts, the results indicate that on the one hand, risk perception levels are high and mental distances to the risk are low, but on the other hand, people are not very frightened and do not proceed to concrete protective behaviour (yet). This might indicate that the risk is perceived to be present but people do not think it will affect them personally, as in with the risk of terrorism and the bird flu. However, they need information so they look for information and talk to others about the risk to satisfy their need for information. Especially the people that have the highest involvement (mid of their careers) display these characteristics. When we took a closer look at the information seeking behaviour, the figures pointed out that people rather passively scan information concerning the financial economical crisis than actively search or look for information when there is a new item on the crisis. Still, the information seeking behaviour is much more present within the context of the financial economical crisis than with the risk of the bird flu and terrorism. We found some interesting gender and age differences: men have significantly higher scores on active, passive and event triggered information seeking than women and the people who are most involved and most vulnerable are again the most active information seekers (active, event-triggered and passive). Concerning the desired information type: top information categories are general information about the crisis, specific information about recent events followed by the probability information and information about the possible consequences.

For the other descriptive statistics, we compared opinion leaders with non-leaders, as we assumed significant and valuable differences between these groups.

We decided to add some additional items that related to opinion leadership. The PCA factor analysis revealed an augmented opinion leadership factor (now 4 items instead of 1) and the convincer trait (4 items). We added these two factors to our list of segmentation variables to perform the cluster analysis. Again, our four group solution was very similar to the solutions in the previous studies in the context of terrorism and the bird flu. The analysis revealed that 25% of the respondents are opinion leaders, a figure that is comparable to the results of the other studies. The classification matrix of the discriminant analysis stated that more than 97% of the cases are correctly assigned to the predicted groups. For the most important group in our research, the opinion leaders, this percentage is 99%. The best predictors in the opinion leaders' classification function were social behaviour, active and passive information seeking and the specific 'convincer' trait. For all further analyses about governmental communication efforts, we compared the results of the opinion leaders versus the non leaders (talking scanners, silent seekers and ignorants). Opinion leaders have a rather specific socio demographical and media profile. They are dominantly males with an average age of 45 years. Their risk perception is higher (and mental distance lower), they look for more information and talk more to people. They have a greater need for information. This need covers most of the types of information that were proposed. We have also gained specific knowledge about this group of people, through which media channels we can reach them and what kind of risk information they need. For governmental communication efforts, the most important perceived role remains protecting the population by taking concrete measures. However, the strong figures that confirm the importance of the government providing information and concrete guidelines in the context of the financial economical crisis indicate that the governments should live up to their role as a risk regulator but also as a risk communicator. When it comes to the communication as a process and the issue of source reliability, the most trusted source of risk information are the experts, followed by the media and the prime minister. People also perceive the government to be in control of the information that is being spread and they are rather critical about governmental information. Opinion leaders were also more critical than the other groups and they also have a higher need for active participation in the communication with the government. The general image of the government as a risk information broker is not positive or satisfactory at all. Especially for the fragile group of opinion leaders, there have to be concrete actions to jack up the satisfaction with the amount, quality and reliability of governmental information. The communication channels that are perceived to be most appropriate to communicate with the people are the media in general, experts and websites (official website). However, we might state that there are a lot of people who do not have a pronounced opinion about this matter. Opinion leaders prefer experts and websites (significantly higher scores) but condemn TV ads as communication tools.

For the third research objective, we started with discussing the correlation matrices that included the linear relationships between the key concepts. They revealed reveal a strong negative relationship between trust and information need and mental distance and

information seeking behaviour and social behaviour. More important are the positive correlations between fear and behaviour and fear and information need. For opinion leaders, we have discovered a statistically significant negative linear relationship between fear and information sufficiency which means that the more opinion leaders have the feeling that they have achieved a satisfactory level of information about the risk, the less frightened they are. For the governmental risk communication, the correlation results make us conclude that it is absolutely necessary to provide enough and qualitative information because these concepts do not only correlate strongly with each other but also with the perceived reliability of the information and the general trust in the government. These correlations are even stronger for the opinion leaders than for non leaders. Again, we tested our three structural equation models with AMOS. The first, basic model that scrutinizes the relationship between the risk regulation and risk communication, showed very strong results. The total amount of explained variance in the perception of the government as a risk regulator by the perception of the government as a risk communicator is 78%, which is very high (beta=0.89, $p<0.001$). The second model that incorporated the concept of satisfaction with the possibility to communicate with the government about the financial and economical crisis was also proven to be statistically significant. The more people are satisfied with the government as a risk communicator, the less they will think that there is no possibility for bottom-up communication. The third model incorporated the concepts of opinion leadership and the need for active participation in the communication process between the government and the citizens. Again, the model was proven to be good. Opinion leadership and satisfaction of the government as a risk communicator together explain 16% of the variance within the variable that measures the need for bottom-up communication.

The multivariate analyses also pointed out the importance of actively using the concept of opinion leaders in a risk communication strategy. Not only does this group of people have very specific risk perceptions and risk information needs, they also have a strong need to participate in a two way dialogue, that is partly determined by the general perception of the government as a risk communicator.

EMPIRICAL PART TWO

MESSAGE ORIENTED RESEARCH

CHAPTER SEVEN

TRUST AND SOURCE CREDIBILITY

1. Introduction

We have extensively discussed the issues of trust and credibilility in chapter three of the theoretical body. We have presented and confronted frameworks and theories of various scholars that scrutinize the concepts of trust and credibility in the context of risk communication and on various levels of analysis (L. Frewer, 2003; Löfstedt, 2005; R. Peters et al., 1997a; Renn & Levine, 1991; Slovic, 1993). We have already discussed the cumulative nature of the five levels of analysis of trust, as discussed by Renn and Levine (1991) by means of the subjoined schematic overview.

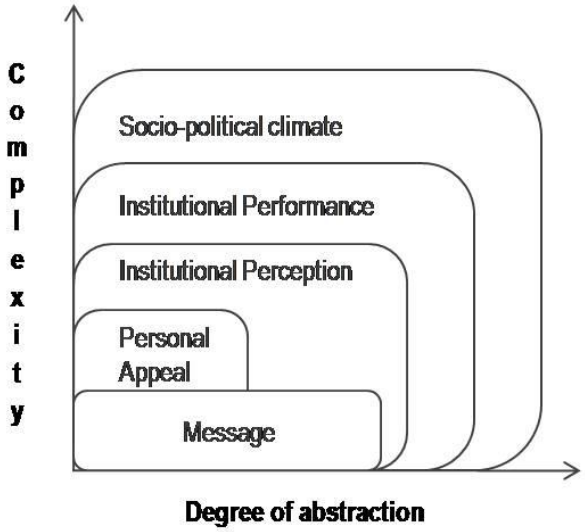


Figure 58: Levels of analysis of trust (Renn & Levine, 1991 p.181)

Renn and Levine concluded that the levels are ordered in terms of degree of abstraction and complexity. The overlap and order of levels integrates the principle that, when trust building efforts are implemented or violated on lower levels, this will affect the next higher level and even push trough to the highest level. We have already scrutinized information reliability, general levels of trust in institutions and institutional performances in the large scaled quantitative studies discussed above. One of the objectives of the two subsequent studies is to measure the variability of information and source credibility in relation to the specific style and tone of voice of the message. So these two studies are performed on the 'lowest' level of analysis, but as mentioned above, research on this level of analysis may also deliver

a valuable input for risk communication development and implementation as effects on trust and credibility will have its implications on higher levels as well.

2. Source credibility and message style

Pornpitakpan (2004) offers with 'The Persuasiveness of Source Credibility: A Critical Review of Five Decades' Evidence' an extended review of researches and literature about the influence of source credibility on the persuasiveness of messages (Pornpitakpan, 2004). He categorizes the factors that interact with source credibility as source, message, channel, receiver, and destination variables. He concludes that, in general, the message and receiver related variables are predominantly scrutinized. Pornpitakpan emphasizes in his recommendations for future research that too little research has been completed about the relationship about the amount of information and source credibility, and the possible interaction between these and related variables. Also Blair names source and information credibility, besides the difficulty in distinguishing between low and high risks and communicating information before it is fully understood, as one of the key issues that hamper effective risk communication. In the same handbook, A. Alm proposes that considerable attention should be paid to the institutional setting of risk communication. He suggests that neutral sources of information could improve the information credibility in risk communication programs. These neutral sources could be universities or other non-profit organizations that are knowledgeable but impartial and that have no own benefits in declaring certain statements about certain risks (Davies et al., 1987b).

The subsequent two studies are an answer to this 'call for research', and will try to make a first attempt to fill up the gap in this area of expertise.

The main research objectives of the two quasi experiments was to look at the relationship between source reliability and credibility of provided information about governmental policy in the context of terrorism and the bird flu and the source specificities. A possible interaction with content style was also scrutinized. Furthermore, there were some specific research questions about the relationship of information quantity and information credibility.

The explorative studies scrutinized the influence of information quantity, information style and source of information on perceived credibility and reliability of communications about governmental initiatives regarding the antiterrorism policy (research report IV) and the bird flu (research report V).

RESEARCH REPORT IV

COMMUNICATION STYLE IN THE CONTEXT OF TERRORISM

1. Experimental design and conditions

We decided to use a factorial experimental design as we wanted to scrutinize the statistical interaction between certain source and message characteristics on the one hand and the information and source reliability and credibility on the other hand. This design is characterized by the fact that there are no control groups, but instead, the various experimental groups function as each other's control groups (Hüttner et al., 1995 p. 425). The benefits of this research design is that it is possible to draw causal conclusions. It also allows us to manipulate the conditions. On the other hand, the external validity of experimental designs is very low, especially due to the small sample sizes that are used.
The main research aim of this experiment was scrutinize the relationship between source credibility, credibility of provided information about the governmental terrorism policy and the source specificities. A possible interaction with content style was also scrutinized. Furthermore, there were some specific research questions about the relationship of information quantity and information credibility. The experimental design included 6 experimental conditions. In total, 120 respondents were assigned randomly to the 6 conditions. The design included 2 factors: source type and message style. There were three source conditions: a press release from the ministry of internal affairs, a press report from a journalist of a current affairs magazine and an interview with an expert, more specifically a professor and advisor in antiterrorism policy. For every source condition we also had two specific text modes: a more emotional, non factual approach to the content and a very informative, factual representation of the content. There were no extra control groups as the different experimental conditions act as each other's control groups.

	Source 1	Source 2	Source 3
Content style	**Spokesperson internal affairs** **Format: press release**	**Journalist** **Format: article**	**Expert** **Format: interview**
Factual	20	20	20
Emotional	20	20	20

Table 118: Overview experimental conditions and allocation of respondents (N=120, 20/condition)

The respondents were given one text, depending on the condition they were in. The text provided them with information about governmental initiatives to prevent terrorist attacks, and a short survey with some statements about perceived source reliability, perceived

knowledge of the source and credibility of the information. Six different texts were written. To prevent possible interaction effects with content related components, the text contents were written as conform as possible. Obviously, it was required to add or adjust some content related components.

2. Items and constructs

The subjoined table provides us with an overview of the key items / concepts were integrated into the small survey that had to be filled out by the respondents.

Construct	N	Items	α
Source credibility	**1**	I think the source is credible	
Information credibility	**1**	The information that is offered in the text is credible	
Source knowledge	**1**	The source has much knowledge about the topic	
Information quantity	**1**	The text provides much information	
Information reliability	**1**	The offered information is reliable	
Attitude towards government	**3**	In general, I think the information that comes from the government is reliable The Belgian government provides us with a sufficient amount of information about terrorism The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of terrorism	**0.71**

Table 119: Overview of the general constructs integrated in the experiment

The cronbach's alpha of the attitude concept (measured by means of three items) exceeded the critical value of 0.65 and all items had an item to total score that was higher than 0.30.

3. Results

3.1. Pretesting of emotional versus factual text conditions

For the first category, the emotional versus the informational text conditions, the difference between both texts was statistically confirmed. The mean score of the texts in the factual conditions was significantly higher than the mean score of the texts in the emotional text conditions (t (118)=-3.46).

The text is objective and factual (6 point Likert scale)		
Condition	**Mean**	**St.Dev**
Emotional	3.8	1.23
Factual	4.5	1.03
t(118)=-3.46, p=0.001		

Table 120: T test results for the pretest of the emotional vs. factual text conditions

3.2. General source credibility

We first tested whether there are initial differences in source credibility between the three source conditions. The Anova test shows that there is a significant difference between the credibility of the source ($F(2,116) = 5.99$, $p = 0.0033$). The government is perceived as being the less credible source. The differences with the expert and journalist conditions are significant (resp. $p = 0.022$ and $p = 0.008$). The difference in perceived source credibility between the expert and journalist condition however is not significant ($p=0.946$).

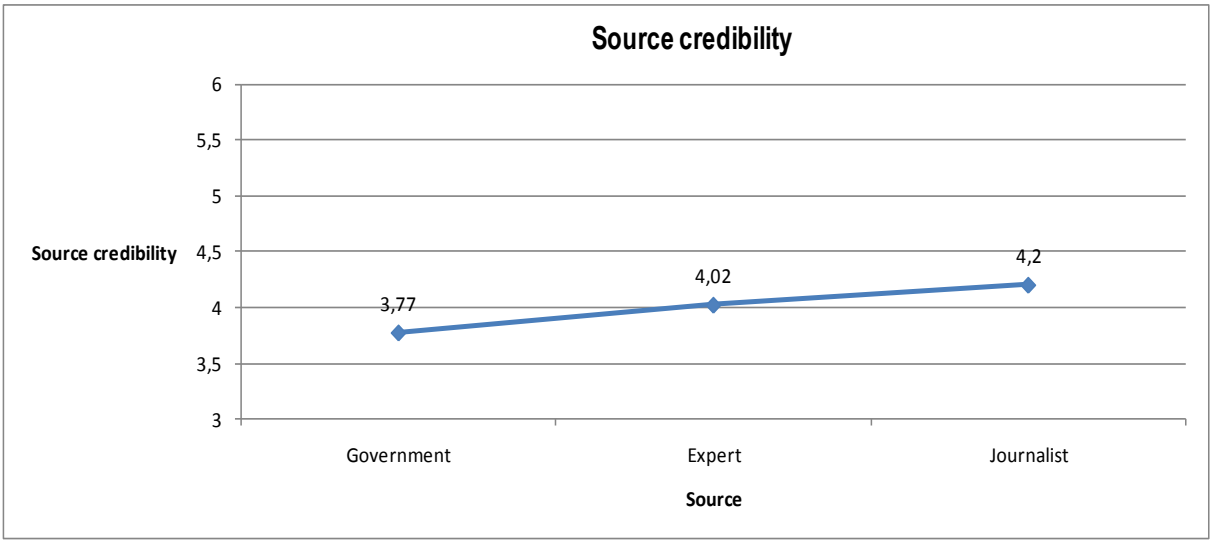


Figure 59: Output Anova (Oneway) for the credibility source / sources

3.3. Emotional versus factual text conditions

For both the information and source credibility, there were no statistically significant differences between the factual and the emotional text conditions (respectively $t(116)=0.22$, $p=0.83$) and $t(117)=-1.06$, $p=0.29$).

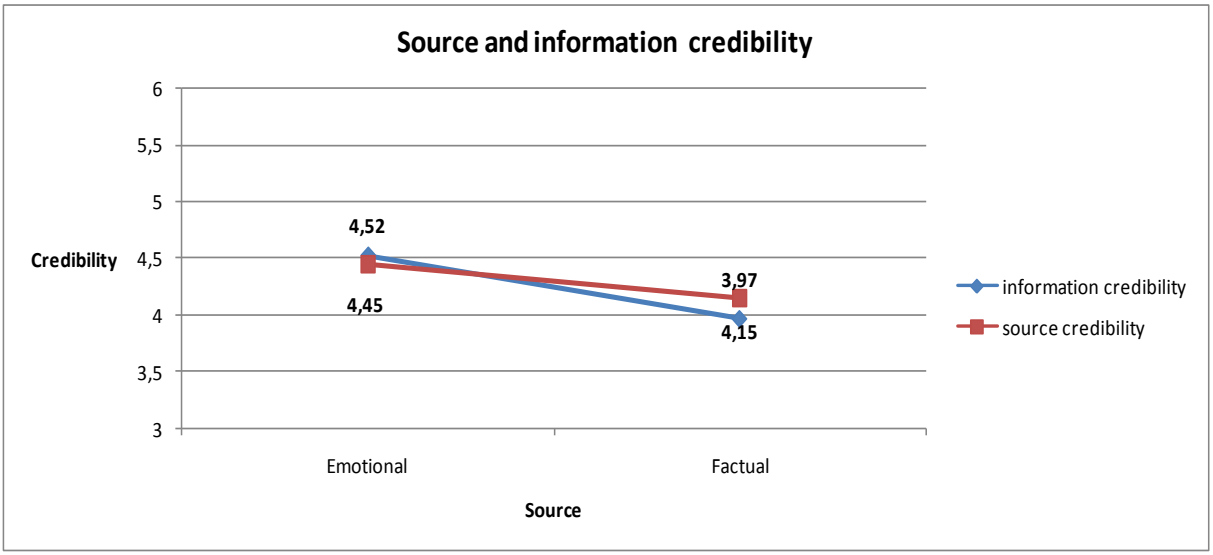


Figure 60: Output Anova information and source credibility for the emotional and factual text conditions

3.4. Interaction between source and communication style

When we look at the interaction effect of content style and source condition, we can confirm that there is a statistically significant interaction (F(2,112)=4.16, p=0.018). The observed power for this interaction, using an alpha of 0.05, is 0.724 so the chance of making a type II error is low. The factual governmental communication is perceived as more credible than the text in the emotional condition. On the opposite, the emotional version of the journalist article was perceived as more credible than the informative version. We did not find any significant differences in credibility for the expert interview.

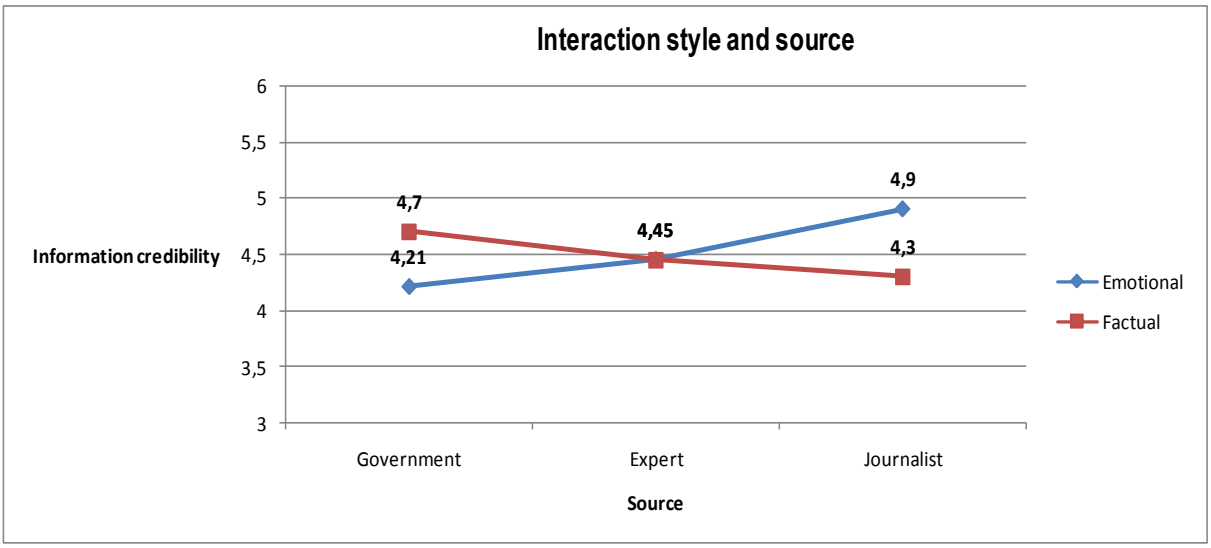


Figure 61: Output ANOVA (2-wayinteraction): credibility information / sources / content style

So in fact, we can carefully conclude that governments should communicate in a more factual and informative style about their anti terrorism initiatives in order to raise the credibility of the information they are spreading.

3.5. Relationship information quantity, perceived knowledge source and information reliability

When we consider the relationship between the perceived amount of information in the text and the information credibility, we can confirm the hypothesis that the the higher the perceived information quantity, the higher the information credibility will be. This is confirmed by means of the correlations, so we can state that there is a strong linear relationship between the amount of information provided and the information credibility ($r=0.516$, $p<0.000$).
When we specify by source, we see that this linear relationship is much stronger in the governmental condition than in the journalist and expert condition.

Source	Correlation coëfficiënts Perceived information quantity*Information credibility
Government	**0.671**
	p<0.000
Expert	**0.417**
	p<0.008
Journalist	**0.413**
	p<0.008

Table 121: Correlations perceived information quantity * information credibility (by source)

Peters, Covello en MacCallum (1997) confirm in an empirical study the relationship between the perceived knowledge of the source and its perceived reliability. We also checked this relationship by means of our data. We may also conclude that there is a strong positive linear relationship ($r = 0.597$, $p<0.000$) between the amount of perceived knowledge of the source and the credibility of the offered information. When we compare the source conditions, we find that this relationship is stronger for the expert as a source as for the government and the journalist condition.

Source	Correlation coëfficiënts Perceived knowledge*Reliability information
Government	**0.578**
	p<0.000
Expert	**0.676**
	p<0.000
Journalist	**0.535**
	p<0.000

Table 122: Correlations perceived knowledge source * information credibility (by source)

3.6. Attitude towards the government

The general attitude towards the government was measured by means of 4 items: the perceived preparedness of the government, the satisfaction with the amount of governmental information about terrorism, the satisfaction with quantity of information about terrorism and the reliability of governmental information. The scale reliability analysis for the 4 item scale provided us with a cronbach's alpha value of 0,71. We divided the respondents into 3 groups: one group with a negative attitude towards the government in the context of terrorism, a group with a neutral attitude and a group with a positive attitude.

	Correlationcoëfficiënts Perceived information quantity*Reliability information
Negative	**0.584**
attitude	P<0.005
Neutral	**0.547**
attitude	P<0.000
Positive	**0.461**
attitude	P<0.004

Table 123: Correlations perceived information quantity * reliability information

The table shows us that the perceived quantity of information is strongly correlated with the information credibility, especially for people with an initial negative attitude towards the government.

4. Conclusions

From the results of this study, we can formulate some concrete rules for governmental risk communication. When we focus on some specific guidelines for governmental risk communication messages, we can state that these messages should primarily have an informative nature, providing the population with specific and tangible facts and figures. These kinds of messages seemed to have a strong positive relationship with the credibility of the offered information. This relationship seemed to be even stronger for the governmental text than for the article written by a journalist or an interview with an expert, especially when experts act as spokesmen. Especially the perceived amount of information provided in the text appeared to be a very important factor in the creation of reliable messages. The higher the perceived information quantity, the higher the credibility of this information. This linear relationship seemed to be the strongest for the governmental communication. When we take in account the initial attitude towards the government, especially the critical group of people with a negative attitude towards the government needs messages that strongly emphasize the provision of objective information. To conclude, it is important to raise the impression of a well informed source that has a lot of knowledge about the topic. It is still important to emphasize the need for further research concerning other content and receiver related characteristics in the context of the perceived reliability of the source and message.

RESEARCH REPORT V

COMMUNICATION STYLE IN THE CONTEXT OF THE BIRD FLU

1. Research objectives

Being confronted with the bird flu as a possible threat to our personal and communal health, the issue of effective risk communication in this context seemed like a very interesting research topic. The bird flu as a risk and a threat has been extensively discussed in research report II that provided us with the results of the quantitative research study in the context of the avian influenza virus. On the other hand, we had already examined the interaction effect between message style and source type on information and source credibility in the context of terrorism. We thought that it would be useful to formulate some concrete communication guidelines that would be based on empirically proven interaction effects between certain message characteristics. So with this explorative study, we wanted to scrutinize the influence of information quantity, information style and source of information on perceived credibility and reliability of communications about governmental initiatives in the context of the bird flu as a risk. We added the concept of positive versus negative message style as in previous studies, positive risk messages had proven to be more effective (Marks, 1990).
We combined the formats of a quantitative survey study with a factorial experimental design.

2. Items and constructs

The subjoined table provides us with an overview of the key items / concepts were integrated into the small survey that had to be filled out by the respondents.

Construct	N	Items	α
Source credibility	**1**	I think the source is credible	
Information credibility	**1**	The information that is offered in the text is credible	
Source knowledge	**1**	The source has much knowledge about the topic	
Information quantity	**1**	The text provides much information	
Information reliability	**1**	The offered information is reliable	
Perceived positivism	**1**	The text is positive	
Attitude towards government	**8**	In general, I think the information that comes from the government is reliable	**0.89**

	The Belgian government provides us with a sufficient amount of information about the bird flu
	The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of the bird flu
	The government has provided us with information timely
	I have a positive attitude towards our current government
	I trust our current government in this current affair (bird flu)
	The Belgian government is sufficiently prepared for an outbreak of the bird flu with animals
	The Belgian government is sufficiently prepared for an outbreak of the bird flu with humans

Table 124: Overview of the general constructs integrated in the experiment

The cronbach's alpha of the attitude concept (measured by means of eight items) exceeded the critical value of 0.65 and all items had an item to total score that was higher than 0.30.

3. Sample

In total, 28 students each had to select 15 respondents according to our selection criteria: gender, age categories and educational level. Eventually, questionnaires were distributed in the period of April 2006. From this sample, 417 surveys could be used for analysis after the data cleaning. The sample is a convenience sample (quota sample) and the distribution of age and gender are comparable to the distribution in the Flemish population, except for a slight overrepresentation of the respondents in the age category of 20-64 years. As the maximum difference was 4%, we did not weigh the data for these categories. However, as the sample size is restricted to 417 respondents, it is important to take into consideration that the descriptive statistics give a clear indication but should be interpreted with care.

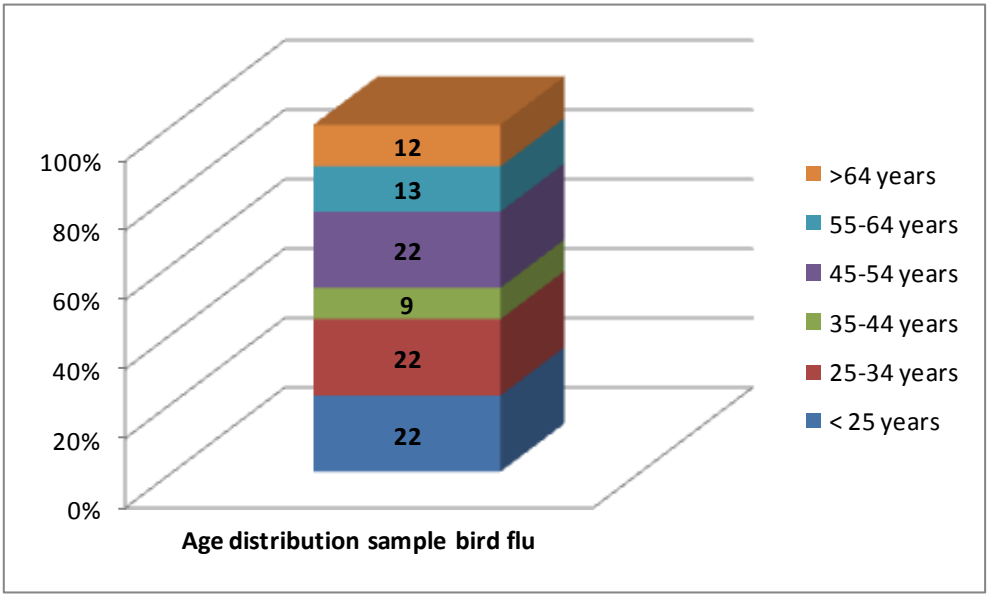


Figure 62: Age distribution sample bird flu study II

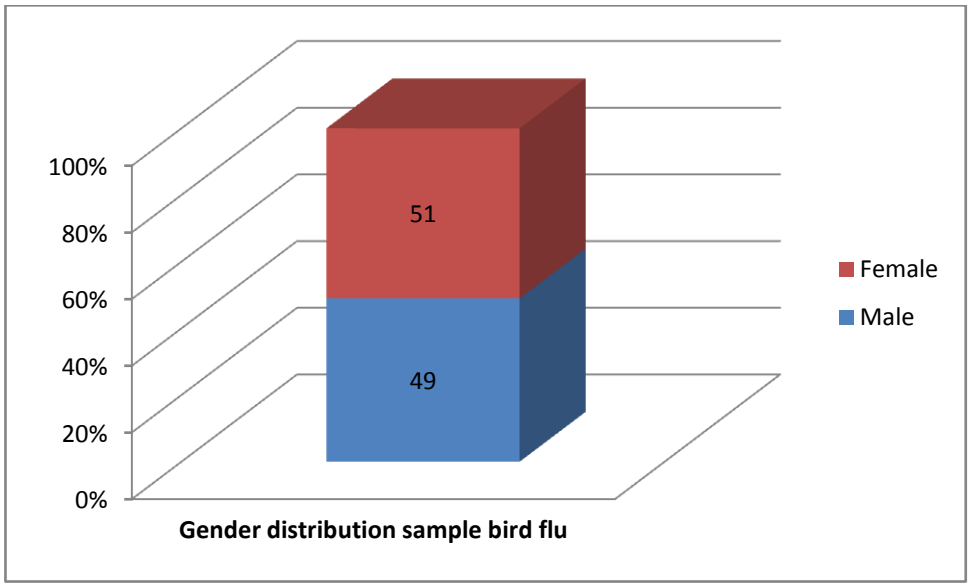


Figure 63: Gender distribution sample bird flu study II

Terrorism I				
Age category	**Male**		**Female**	
	Flanders	**Sample**	**Flanders**	**Sample**
20-64	**39%**	**43%**	**38%**	**42%**
≥65	**10%**	**11%**	**13%**	**13%**
$N_{Flanders}$ =6043161 N_{sample} =417				

Table 125: Comparisons sample and population percentages sample bird flu study II

4. Results

4.1. Descriptive statistics

We will first provide a summary of the general descriptive statistics of the key concepts that were scrutinized by means of the small survey preceding the questions that were related to the text of the experimental condition. We have results for 417 respondents. Except for some missings, there were no significant missing data that could be labelled as non ignorable. As the final aim of the study was not to perform a full sized quantitative survey study in the context of the bird flu we only integrated the key items that measured risk perception, protective behaviour, information seeking behaviour and perceptions about governmental preparedness and communication efforts into the survey. The statements were measured on 6 point Likert scales so the means should be interpreted on a 6 point scale, ranging from 1 (totally do not agree) to 6 (Totally agree). Besides means, we also

integrated the percentages of respondents that gave outspoken answers: % low represents the percentage of respondents that gave a rating of 1 or 2 on the scale and % high represents the percentage of respondents that gave a rating of 5 or 6. Again we assume that in some matters, the respondents do not have an outspoken opinion or attitude and they will answer rather neutrally. It is important to have an idea of these percentages.

4.1.1. Risk perception

Construct	Mean	St.Dev.	% Low	% High
Perceived probability of outbreak of virus with birds in Belgium	3.76	1.19	16	26
Perceived probability that the variant of the virus that is transferrable between animals and humans will break out in Belgium	3.39	1.10	21	15
Perceived probability that the variant of the virus that is transferrable between humans will break out in Belgium	3.07	1.14	34	10
I already took protective measures in case there would be an outbreak of the bird flu in Belgium (medicines, etc.)	2.36	1.43	67	13

Table 126: Descriptive statistics risk perception in bird flu II

For risk perception, we only considered the perceived probabilities of the risk of bird flu. The means, that vary between 3.07 and 3.76, indicate that the level of perceived probability is higher than the average of 3, but not really outspoken. We can retrieve more information from the percentages. Over the three categories of threats, the respondents answer quite neutrally (56% to 64%). As the proximity of the threat increases, the perceived probability level decreases: where 26% of the respondents have high probability scores for the outbreak of a virus with birds (16% has a low score), this percentage decreases to 15% for the probability of a virus that is transferrable between animals and humans (21% low) and even to 10% (34% low) for the outbreak of the virus that is transferrable between humans, which is the most threatening to the individual. Parallel to study II, we find some confirmation of the denial' bias (Thompson, 1985). We also notice that 13% has already took protective measures to be prepared for an outbreak of the virus in Belgium, while 67% has not done this so far. The neutral category is limited to 20%. There were no significant differences for gender or age categories.

Besides the protective behaviour, we also scrutinized the basic information seeking behaviour: active and event triggered information seeking and passive information scanning.

4.1.2. Information seeking behaviour

The items of the information seeking behaviour scale that was used in the previous large scaled surveys were used again in this study. The statements had to be rated on 6 point

Likert scales. The chronbach's alpha for the passive information seeking scale (3 items) was 0.86 and all item total correlations exceeded 0.30 (minimum 0.59).

Construct	Mean	St.Dev.	Gender	Age	% Low	% High
Active info seeking	2.73	1.25		<35 year = 2.52 35-44 year = 2.2.56 45-64 year = 2.95 >64 year = 3.00 *F(3,411)=4.35***	48	11
Event triggered info seeking	2.76	1.12	Male = 2.64 Female = 2.88 *t (414)=-2.15**	<35 year = 2.40 35-44 year = 2.58 45-64 year = 3.08 >64 year = 3.29 *F(3,410)=15.77****	43	9
Passive info scanning	3.56	1.10	Male = 3.42 Female = 3.70 *t (415)=-2.65***	<35 year = 3.24 35-44 year = 3.56 45-64 year = 3.81 >64 year = 4.01 *F(3,411)=11.37***	25	17
Significance key	* p≤0.05	** p≤0.01	*** p≤0.001			

Table 127: Descriptive statistics information seeking behaviour bird flu II

We can state that about 10% of the respondents look for information about the bird flu actively or when they are triggered by a news item but 43% to 48% has low scores for these types of information seeking. The means are 2.7 on the 6 point scale, so below average. For passive information scanning, the mean is higher (3.56) and so is the percentage of respondents that score high (17%). We also notice that 48% to 58% answered rather neutrally on these concepts. We can conclude that the information seeking behaviour in the context of the bird flu is rather weak, but that there is a large and non ignorable portion of people that do not have outspoken opinions. Should there ever be a more proximate threat or even an outbreak, the percentages could shift very rapidly and in large numbers.
The next step is to describe the general perception of the government as a risk regulator and communicator.

4.1.3. Perception of the government as risk regulator and communicator

The perception of the government as a risk regulator was translated in terms of perceived preparedness of the government for an outbreak of the flu and in terms of trust in the government in the context of the bird flu.

4.1.3.1. Governmental preparedness

Construct	Mean	St.Dev.	% Low	% High
I trust the current government in this matter	3.70	1.11	15	21
The Belgian government is sufficiently prepared for an outbreak of the bird flu with animals	3.64	1.09	14	21
The Belgian government is sufficiently prepared for an outbreak of the bird flu with humans	3.18	1.12	25	11
Significance key	* p≤0.05 ** p≤0.01 *** p≤0.001			

Table 128: Descriptive statistics perceptions governmental preparedness bird flu II

We notice that the means for perceived preparedness vary from 3.18 to 3.70 and the percentages of respondents that rated high on the items vary from 11% to 21%. The lowest scores are for the perceived preparedness for an outbreak of the flu with humans, which is in fact the most threatening for the individuals. We could state that there is low trust in the government as a risk regulator, but it is also important to take a look at the number of respondents that answered neutrally: this percentage is about 65%, which is very high. So we can conclude by saying that there is not really an outspoken opinion about the perceived preparedness of the government for the bird flu in general.

4.1.3.2. Governmental risk communication

The subjoined table commences with the figures about the satisfaction with the quantity of information provided by the government about the bird flu. The means are above average (vary from 3.71 to 3.87) and 21% (info about protective measures) to 26% (info about bird flu in general) assign high scores. Only 13% and 8% has low scores for these items. Again, the vast majority (66%) is rather neutral. We find about the same figures for the statement about the possibility of active participation in the communication process with the government. The respondents have a somewhat more outspoken idea about the accuracy of the information provision. The mean is 4 on the 6 point scale and 34% assigned a high score to this statement. Even more respondents had an outspoken opinion about the role of the government as a risk communicator in this risk context, and more particularly in the positive sense: 89% of the respondents agree strongly with the statement that it is the obligation of the government to inform civilians as good as possible about the bird flu and only 1% does not agree.

Construct	Mean	St.Dev.	% Low	% High
The Belgian government provides us with a sufficient amount of information about the bird flu	3.87	0.95	8	26
The Belgian government provides us with a sufficient amount of information about their initiatives and measures in the context of the bird flu	3.71	1.01	13	21
The government has provided us with information timely	3.96	1.09	11	34
Duty of government to inform civilians as good as possible (dispersion, prevention…)	5.27	0.77	1	89
Civilians do not get the opportunity to communicate with the government about the bird flu	3.68	1.06	12	22
Significance key	* p≤0.05	** p≤0.01	*** p≤0.001	

Table 129: Descriptive statistics perceptions government as a risk communicator bird flu study II

From this section we can conclude that people do not really have an outspoken opinion about the specific governmental risk communication efforts (in terms of quantity and timeliness). On the other hand, almost the entire sample of respondents agreed with the proposed role of the government as the main risk communicator in the context of the bird flu.

To conclude the previous paragraphs, we can state that there is not really an outspoken opinion about the perceived preparedness of the government for the bird flu in general. We could speculate about the reasons for this. The Belgian government does not really have a reputation of communicating a great deal about their initiatives and protective measures in the context of various risks. So we could assume that the community does not have a clear view on these initiatives and safety measures because of this lack of information. On the other hand, the expectations are very high and the potential role of the government as a risk communicator is non ignorable. These findings indicate that the governments will be challenged to construct solid risk communication programmes to meet the need for governmental risk communication. On the other hand, it is a challenge that can be leveraged to an opportunity because the image that can be constructed can induce a sense of trust and positive attiude towards the government and its initiatives. Ideally, this increase in trust could even be transmitted to a general positive attitude and high trust level in all domains.

These results of the small additional questionnaire indicate and confirm the results of the previous quantitative survey studies that were performed in the context of risks. We will provide a clear overview and comparison of the key findings of the studies in the next chapter. We will now discuss the findings of the experimental study.

4.2. Results of the factorial experiment

4.2.1. Confirmation of experimental conditions

We first had to confirm our experimental conditions.

4.2.1.1. Informative versus persuasive texts

For the first category, the persuasive versus the informative text conditions, the difference between both texts was marginally acceptable (p values = 0.059)

The provided information in the text plays in the advantage of the government (6 point Likert scale)		
Condition	Mean	St.Dev
Persuasive	4.6	1.02
Informative	4.2	1.08
t(203)=1.9, p=0.059		

Table 130: T test output persuasive vs. informative text conditions and persuasive information

The source communicates very objectively (provides us with pure facts) (6 point Likert scale)		
Condition	Mean	St.Dev
Persuasive	3.5	1.09
Informative	3.8	1.09
t(203)=-1.9, p=0.059		

Table 131: T test output persuasive vs. informative text conditions and objectivity

4.2.1.2. Positive versus negative texts

For the second category of texts, the positive versus the negative texts, we found that the positive text had a significantly higher mean for the item (The text is positive) than the text in the negative condition.

	The text is positive (6 point Likert scale)	
Condition	Mean	St.Dev
Positive	4.6	0.91
Negative	3.4	1.14
t(191)=7.84, p<0.000		

Table 132: T test output positive versus negative text conditions and positivity

4.2.2. Results

4.2.2.1. General source credibility

The Anova test shows that there is a significant difference between the credibility of the three sources ($F(2,410) = 6.78$, $p = 0.001$). The expert is perceived as the most credible source, the journalist is perceived as being the less credible source. The differences with the expert and journalist and government and journalist conditions are significant (resp. $p = 0.002$ and $p = 0.049$). The difference in perceived source credibility between the government and expert condition however is not significant ($p=0.523$).

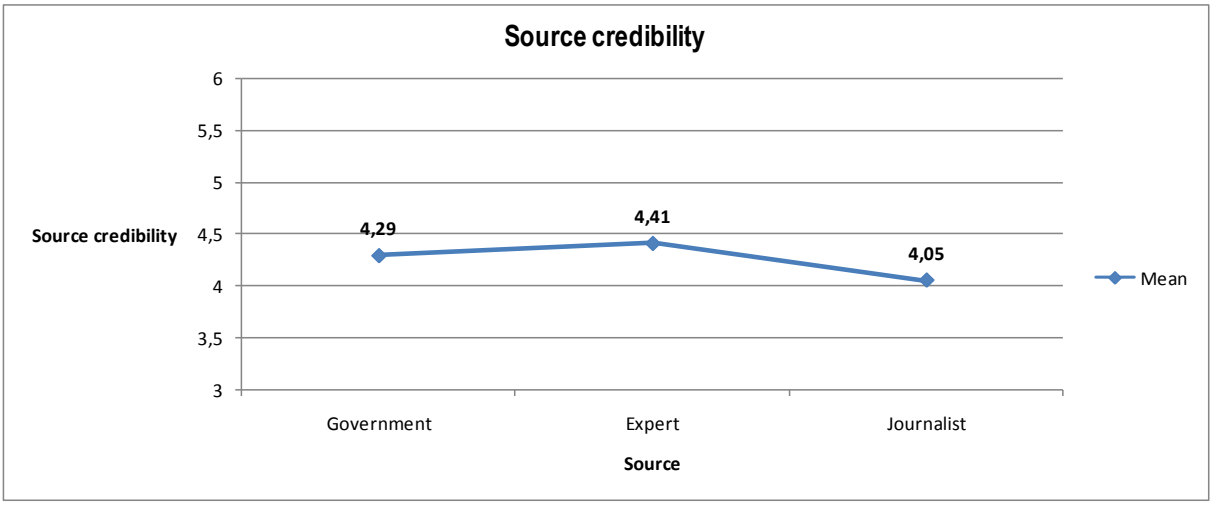


Figure 64: Anova source credibility for the three sources

Positive versus negative text conditions

We compared the mean source credibility and mean information credibility of the texts in the positive and negative conditions. We found statistically significant differences for both concepts. The information in the positive text is perceived as more credible than the information in the negative text condition ($t(205)=3.52$, $p=0.001$). Same accounts for perceived source credibility ($t(206)=3.72$, $p=0.000$).

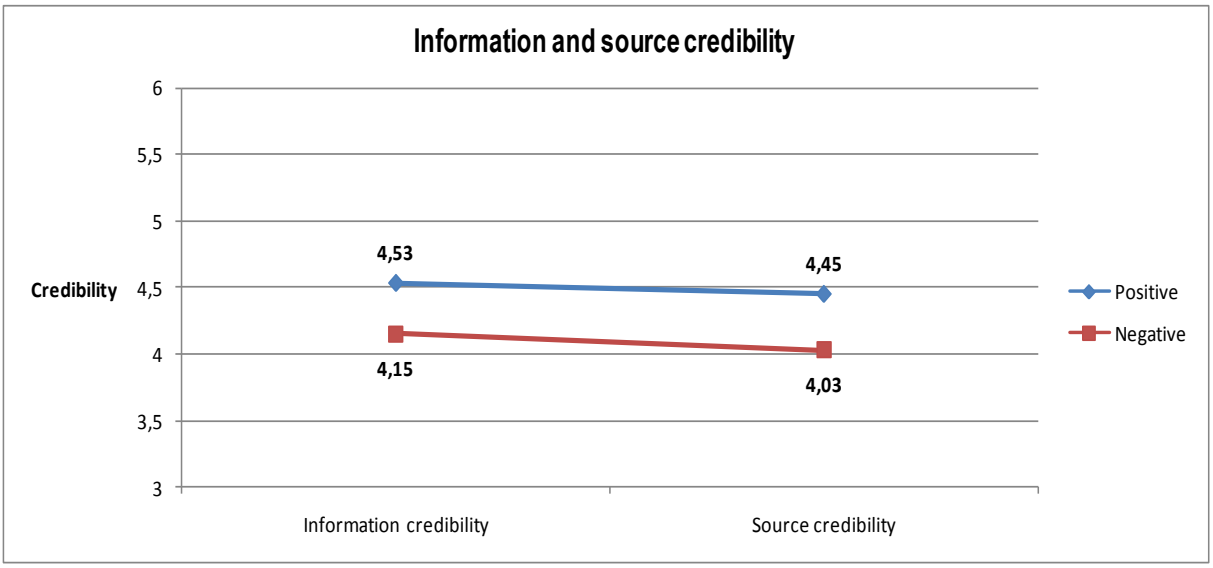


Figure 65: Information and source credibility of the positive and negative text conditions

This means that texts that have positively formulated contents have a higher credibility (both information and source) than negatively formulated contents.

4.2.3. Information credibility

When we look at the interaction effect of content style (positive and negative) and the source conditions, we can confirm that there is an interaction between information style and source ($F(2,206)=3.75$, $p=0.025$). The observed power for this interaction, using an alpha of 0.05, is 0.68 so the chance of making a type II error is rather low. The analysis output shows the information in the positive text conditions is perceived equally credible for the three source conditions. On the other hand, for the negative text conditions, we notice that the information credibility is much lower, especially for the journalist text. For the governmental condition, the difference in information credibility between the positive and negative texts is not significant ($t(67)=0.81$, $p=0.42$) and same accounts for the expert condition ($t(57)=1.27$, $p=0.21$). Remarkably, the difference between the positive and negative texts in the journalist condition is statistically significant ($t(67)=3.79$, $p=0.000$).

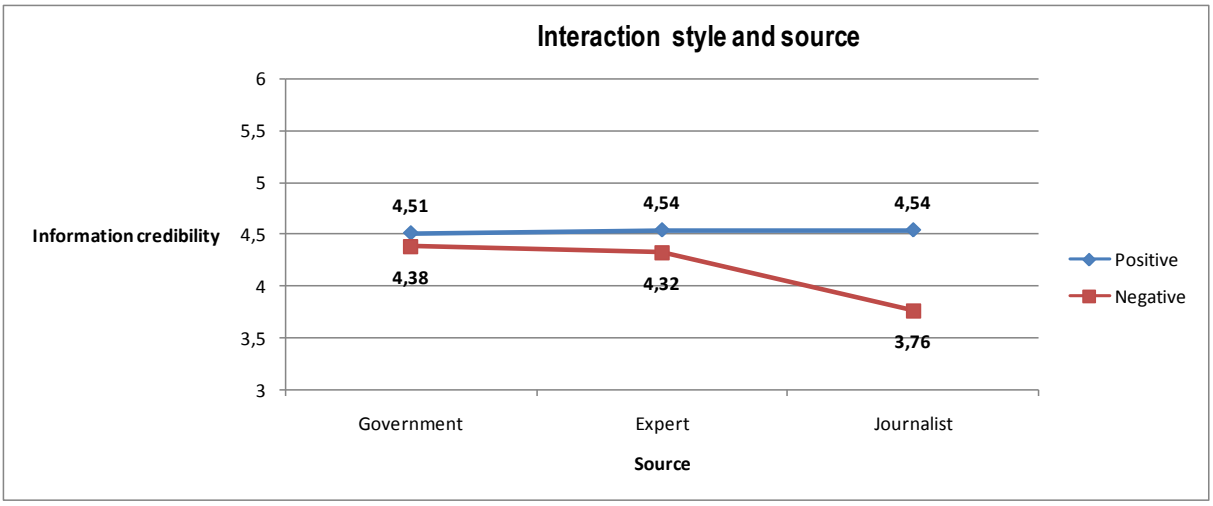


Figure 66: Interaction effect of message style and source on information credibility -two way anova

So we can conclude that there are no large differences in information credibility when the text that holds the information is formulated in a positive or a negative manner for the communication that comes from the government or from an expert. For journalists, however, it is very important to communicate positively as it will increase their information credibility.

4.2.4. Source credibility

For source credibility, we also found an interesting result. There was no interaction between information style (positive versus negative) and source ($F(2,207)=0.60$, $p=0.548$).
The difference in source credibility scores for the positive and negative governmental texts was not significant ($t(67)=1.32$, $p=0.193$). On the other hand, the positive texts has higher source credibility means for both the expert as a source ($t(67)=2.51$, $p=0.015$) as the journalist as a source of information ($t(68)=2.76$, $p=0.007$).

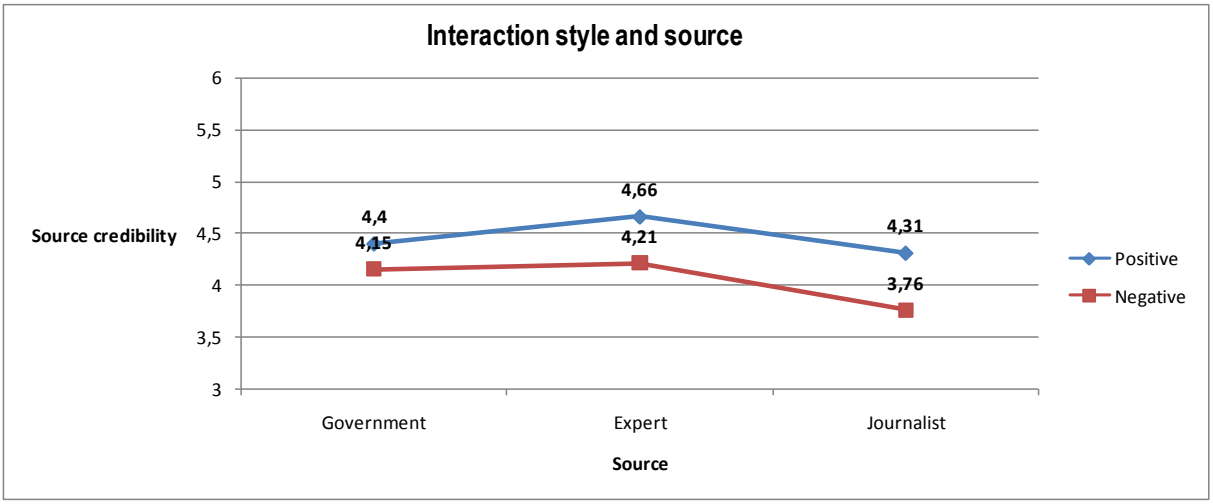


Figure 67: Interaction effect message style and source on source credibility – two way anova

Persuasive versus informative text conditions

We did not find any significant difference in information (t(203)=1.002, p=0.317) and source credibility (t(203)=0.061, p=0.951) between the informative and persuasive texts.

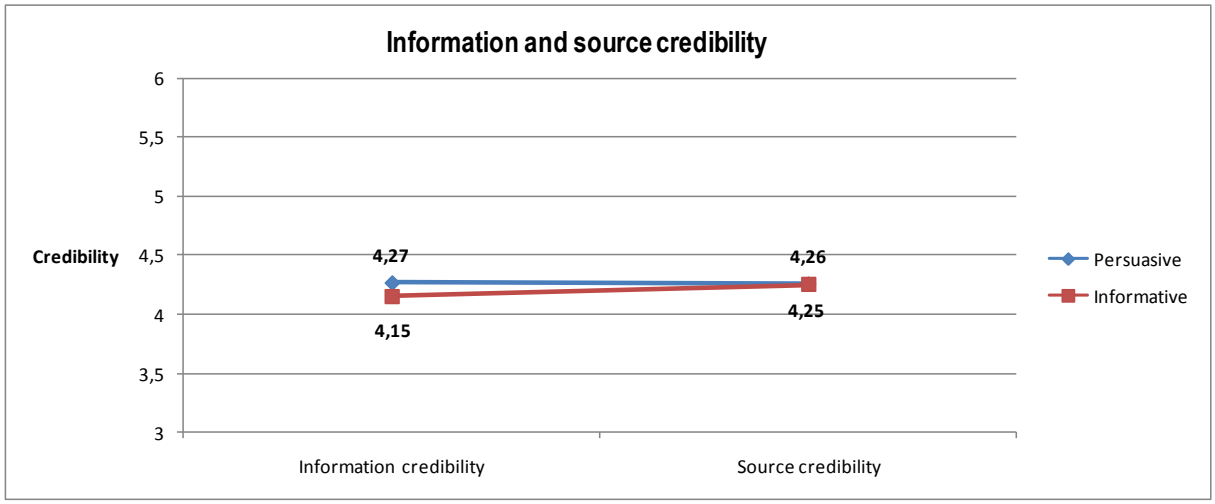


Figure 68: Information and source credibility for persuasive and informative text conditions

4.2.5. Information credibility

For information credibility, we can confirm a marginally acceptable (p slightly exceeds 0.05) significant interaction effect between communication style (persuasive and informative) and source (F(2, 204)=2.99, p=0.053), the observed power for the interaction effect is 0.58, which is rather low.

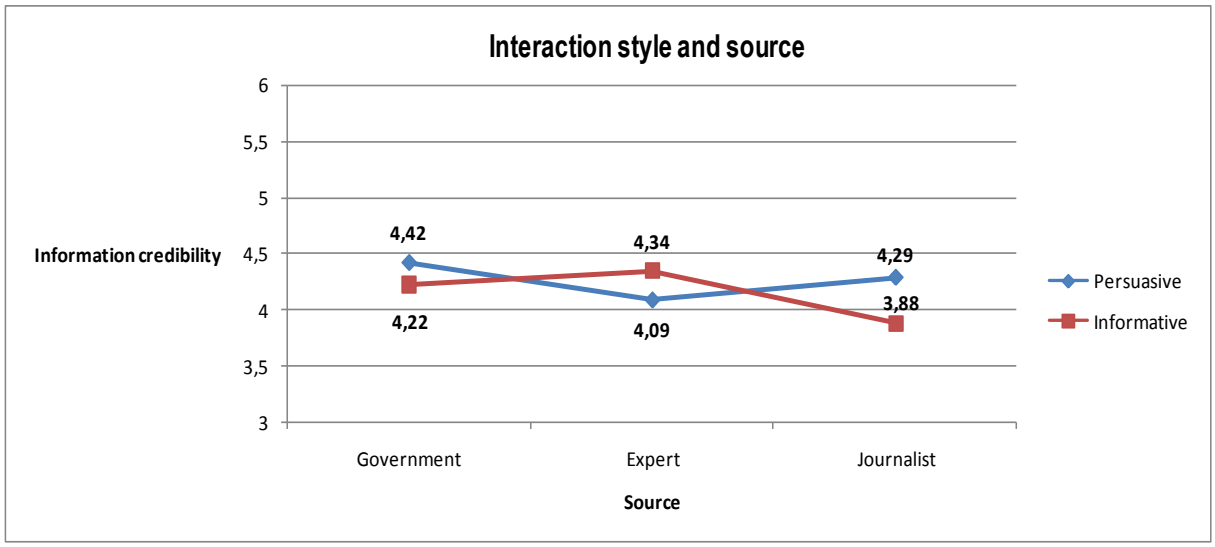


Figure 69: Interaction effect message style and source on information credibility – two way anova

For the governmental texts and the texts of the expert, there were found no significant differences in information credibility (respectively t(66)=1.06, p=0.293 and t(66)=-1.163, p=0.249) between the persuasive and the informative version. For the journalist texts, we did find a significant result: the informative version had a higher mean for information credibility than the persuasive version (t(67)=2.264, p=0.027).

4.2.6. Source credibility

For source credibility, we did not find a significant interaction effect (F(2,204)=2.714, p=0.069).
The only significant difference in means of source credibility was for the text in the expert condition. The informative text had a higher source credibility mean than the persuasive text (t(65)=-2.068, p=0.043).

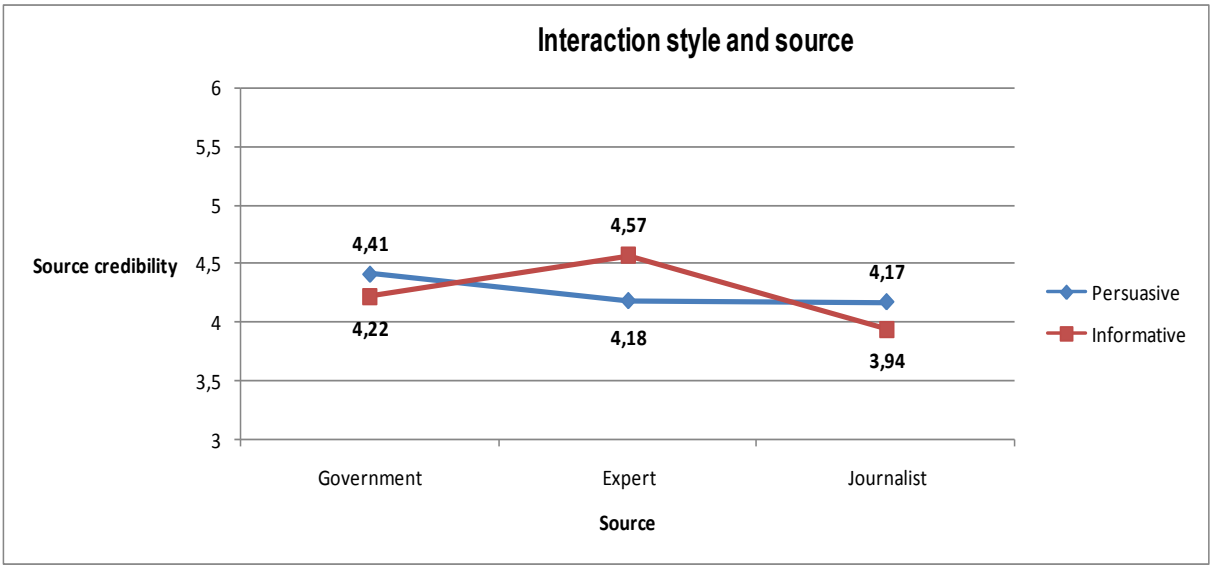


Figure 70: Interaction effect message style and source on source credibility – two way anova

4.2.7. Relationship information quantity and reliability of the information

When we consider the relationship between the perceived amount of information in the text and the information credibility, we can confirm the hypothesis that the more information is perceived to be offered, the higher the information credibility. This is confirmed by means of the correlations, so we can state that there is a moderate linear relationship between the amount of information provided and the information credibility ($r = 0.31$, $p<0.000$).
When we specify by source, we see that this linear relationship is slightly stronger in the governmental condition than in the journalist condition and expert condition.

Source	Correlation coëfficiënts	
	Quantity*Information credibility	Quantity*source credibility
Government	**0.32**	**0.30**
	p=0.000	p=0.001
Expert	**0.30**	**0.51**
	p=0.000	p=0.000
Journalist	**0.30**	**0.43**
	p=0.001	p=0.001

Table 133: Correlations perceived information quantity * information and source credibility (by source)

When we consider the relationship between perceived quantity of information and source credibility, the correlation coefficient of 0.41 (p=0.000) indicates a relatively strong positive linear relationship. This relationship is relatively stronger for the journalist condition and even stronger for the expert condition.

4.2.8. Perceived degree of positivity text and information credibility

For the relationship between the degree in which the text is perceived to be positive and the information and source credibility, we found moderate correlations (r=0.32 and r=0.31, p=0.000). On the other hand, when we split up the correlations for source, we can see that the correlation coefficient is moderately greater for the journalist condition.

Source	Correlation coëfficiënts	
	Positivism*Information credibility	Positivism*source credibility
Government	**0.26**	**0.26**
	p=0.002	p=0.002
Expert	**0.17**	**0.24**
	p=0.045	p=0.006
Journalist	**0.45**	**0. 38**
	p=0.000	p=0.000

Table 134: Correlations perceived information positivism * information and source credibility (by source)

These correlation coefficients confirm the previous finding in the ANOVA analysis that it is especially important for journalists to formulate their information in a positive way to increase the credibility of the information they are offering.

4.2.9. Perceived knowledge and source credibility

As mentioned in the previous experiment in the context of terrorism, Peters, Covello en MacCallum (1997) confirmed in an empirical study the relationship between the perceived knowledge of the source and its perceived reliability. We may also conclude that there is a relatively strong positive linear relationship (r=0.49, p<0.000) between the amount of perceived knowledge of the source and the credibility of the offered information and even a stronger positive linear relationship between the perceived amount of knowledge and source credibility (r=0.60, p=0.000). When we compare the source conditions, we find that this relationship is stronger for the expert as a source as for the government and the journalist condition.

Source	Correlation coëfficiënts	
	Perceived knowledge*information credibility	Perceived knowledge*source credibility
Government	**0.52**	**0.64**
	p=0.000	p=0.000
Expert	**0.61**	**0.70**
	p=0.000	p=0.000
Journalist	**0.28**	**0.44**
	p=0.001	p=0.000

Table 135: Correlations perceived knowledge * information and source credibility (by source)

4.2.10. Attitude towards the government

We decided to add some more items that can be good indicators for the general attitude of the respondents towards the government. The general attitude towards the government was measured by means of 8 items (mentioned in the table). The scale reliability analysis for the 4 item scale provided us with a cronbach's alpha value of 0,89. We divided the respondents into 3 groups: one group with a negative attitude towards the government in the context of the bird flu, a group with a neutral attitude and a group with a positive attitude.

Source	Correlation coëfficiënts	
	Quantity*Information credibility	Quantity*source credibility
Negative attitude	**0.36**	**0.45**
	p=0.003	p=0.000
Neutral attitude	**0.21**	**0.32**
	p=0.000	p=0.000
Positive attitude	**0.56**	**0.78**
	p=0.046	p=0.001

Table 136: Correlations perceived information quantity * information and source credibility (by attitude)

The figures point out that the correlation coefficients for the linear relationships between perceived quantity of information and information and source credibility are higher for respondents with an outspoken attitude (negative and positive) towards the government. People with outspoken attitudes will probably need more information to be convinced as the level of information and especially source credibility raises with the perceived quantity of information that is provided. People with neutral attitudes are probably not strongly involved with the issue and so the relationship is not that outspoken. It will be important to provide a sufficient amount information in order to address both people with negative as positive attitudes towards the government.

5. Conclusions

The first results of the small quantitative survey that was added revealed some interesting descriptive statistics. For risk perception, we only considered the perceived probabilities of the risk of bird flu. As the proximity of the threat increases, the perceived probability level decreases. So parallel to study II, we find some confirmation of the denial' bias (Thompson, 1985). We also noticed that only a small portion has already taken concrete protective measures. For information seeking behaviour, we can conclude that it is rather weak in the context of the bird flu, but that there is a large and non ignorable portion of people that does not have outspoken opinion. Should there ever be a more proximate threat or even an outbreak, the percentages could shift very rapidly and in large numbers. As for the perceptions about the government as a risk regulator, we could state that trust levels are low, but it is also important to take a look at the number of respondents that answered neutrally: this percentage is about 65%, which is very high. So we can conclude by saying that there is not really an outspoken opinion about the perceived preparedness of the government for the bird flu in general. We can speculate about the reasons for this. The Belgian government does not really have a reputation of communicating a great deal about their initiatives and protective measures in the context of various risks. So we could assume that the community does not have a clear view on these initiatives and safety measures because of this lack of information. On the other hand, the expectations are very high and the potential role of the government as a risk communicator is non ignorable. These findings indicate that the governments will be challenged to construct solid risk communication programs to meet the need for governmental risk communication. On the other hand, it is a challenge that can be leveraged to an opportunity because the image that can be constructed can induce a sense of trust and positive attitude towards the government and its initiatives. Ideally, this increase in trust could even be transmitted to a general positive attitude and high trust level in all domains.

Concerning the experimental design, we will now discuss most important results and the general conclusions that can be drawn from the results. The ANOVA results pointed out that both source and information credibility were higher for positive texts than for negative texts. When we took a look at the interaction effect between the nature of the text (positive

versus negative) and the source, the data pointed out that there are no large differences in information credibility when the text that holds the information is formulated in a positive or a negative manner for the communication that comes from the government or from an expert. For journalists, however, it is very important to communicate positively as it will increase their information credibility. The positive texts also had higher source credibility means for both the expert as a source as the journalist as a source of information. So it is better to communicate information in a positive style. F

We also included correlations between some key concepts that were already scrutinized in the previous studies in other risk contexts. Firstly, when we consider the relationship between the perceived amount of information in the text and the information credibility, we can confirm the hypothesis that perceived quantity of risk information about the bird flu correlates positively with the information credibility. The correlation coefficient was remarkably stronger for the expert condition. For the relationship between the degree in which the text is perceived to be positive and the information and source credibility, we found moderate correlations but when we split up the correlations for the source conditions, we noticed that the correlation is fairly stronger for the journalist condition. We may also conclude that there is a relatively strong positive linear relationship between the amount of perceived knowledge of the source and the credibility of the offered information and even a stronger positive linear relationship between the perceived amount of knowledge and source credibility. When we compare the source conditions, we find that this relationship is stronger for the expert as a source as for the government and the journalist condition.

The last correlation table took into account the concept of attitude towards the government. People with outspoken attitudes need more information to be convinced as the level of information and especially source credibility raises with the perceived quantity of information that is provided. People with neutral attitudes are probably not strongly involved with the issue and so the relationship is not that outspoken. It will be important to provide a sufficient amount information in order to address both people with negative as positive attitudes towards the government.

CHAPTER EIGHT

SUMMARIZING CHAPTER EMPIRICAL BODY

1. Introduction

This empirical body has offered five research reports that summarize the research that has been completed during the period of 2004-2009. The final aim of the reports was to provide a clear overview of the research topics, objectives, methodologies and results of the 8 studies that have been performed in the broad context of risk perception and risk communication. This chapter will present an overall summary of the most remarkable results of the 8 studies. We will try to integrate conclusions that compare and confront research results. These conclusions will form the foundation of some general policy recommendations that can be used to construct effective and generic risk communication strategies in various risk contexts.

2. Confrontation of the results with the research objectives

2.1. Risk communication audit

Our primary research objective was to construct and validate a methodology that allows us to scrutinize various elements of the strategic environmental audit in the context of risk. The concept of the environmental audit was proposed by William Leiss in 1996. He specified that the strategic environmental audit could be operationalized by the formulation of a code of good communication practice and that this code could be verified by a risk communication audit. Although these concepts in his proposed approach were very abstract, we decided to construct and validate a concrete methodology that incorporates various elements of the risk communication audit. The methodology was organically constructed and includes elements from the theoretical framework of risk communication and risk information processing (see theoretical body). Starting from the basic drivers, we decided to add more key driver concepts, based on the literature. We also wanted to validate the methodology in various risk contexts such as terrorism, the bird flu and the recent economical and financial crisis as our methodology should be applicable in most risk contexts. The eventual measurement tool can be used to describe current risk perception levels, risk information needs, fear levels etc. and of course the interrelationships between these concepts. It offers us a clear audit of the risk perceptions and its related concepts, and it allows us to identify crucial elements for improvement.

The descriptive statistics allow us to draw some general conclusions that transcend the specific risk contexts. For the concepts of risk perception, mental distance, level of fear and behaviour (intentions), the descriptive figures indicate that, even though the majority of the respondents perceive the terrorist threat and the bird flu as a risk that is very near (low mental distance), the actual percentage of people who have a high probability level, who are affected in their fear levels and behavioural intentions, who talk a lot to others about the topic and who indicate that they look for information about the risks is rather low. For the financial crisis, the figures are more outspoken and indicate a higher degree of communal concern about the risk. For risk perception and mental distance in the context of the bird flu, it is remarkable that the data revealed levels that are rather high but decrease according as the threat is positioned in the near proximity of the respondents. So we can clearly see that the bird flu as a threat is a perceived risk that is near, but it will not affect the person himself. This is what is called the 'personal invulnerability' bias and especially the 'denial' bias (Thompson, 1985). These psychological defense mechanisms allow human beings not to be preoccupied with the evaluation of personal risk, which would only induce increased levels of chronic anxiety and stress (Handmer & Penning-Rowsell, 1990).

Another remarkable finding is that a lot of people answer quite neutrally, which indicates that the majority does not really have an outspoken opinion, probably because the risk is not transparent and especially because the Belgian population have not (yet) been confronted with terror attacks or an outbreak of a variant of the H5N1 virus that affect the population personally. As for the financial crisis, the figures are much more polarized and the percentage of people that answers neutrally is remarkable smaller. This is probably due to the fact that the risk of the financial crisis has affected the people more directly and that the risk has turned into a more outspoken crisis situation. When a risk situation is defined and perceived as a crisis situation, information needs will increase, which will induce information seeking behaviour. Media coverage was also much higher during the period of data collection so the responses of the respondents might be slightly biased.

Separate descriptive sections were written about the public perceptions of the government as a risk regulator and risk communicator. We might conclude that the government is primarily perceived as a risk regulator, carefully preventing risks to turn into crises. However, we can also state that its role as a crisis and risk communicator is perceived very important as well, especially because only negligible percentages of respondents stated that these roles are not important. For the specific trust in the government as a risk regulator, we assessed the perceived preparedness of the governments on various levels. We can conclude that it is important so set up the general objective to raise the general trust and perceived preparedness of local governments. This raise could contribute to the general construction of a communal resilience and a perceived preparedness climate so that risk and crisis guidelines will be taken at heart when they are communicated. The general trust in governmental institutions as risk communicators is strongly dominated by the public perceptions about the quantity and quality of the offered information and the perceived reliability of this risk information. In the context of terrorism and the bird flu, the perceived quality and reliability of governmental information is relatively high and stable.

In the context of the financial and economical crisis as a risk, the respondents were much more suspicious and dissatisfied with the information quality and there was a much greater lack of general trust in the government. A remarkable result that can be retrieved in all three risk contexts includes the fact that people are not satisfied with the amount of risk information that is offered by the government. When we confront the apparent and general conclusion that government has an important role to fulfill as a risk communicator (besides risk regulation) with the findings that there is a consistent need for more governmental risk information, we can conclude that governmental risk communication really has to be integrated in the top priorities for risk policy improvements. However, as the general perception of the quality and reliability of the offered information is rather positive, the weakness of the perceived information gap could be reformulated as an opportunity if risk (communication) managers are able to construct solid risk communication strategies that include the importance of communicating sufficiently. Naturally, the amount and the nature of the information that is offered will depend on the specific risk contexts. The most important managerial conclusion is that the presence of and accessibility to risk information is crucial, and that governments play a vital role as risk information generators and mediators in this process. The fact that the government is also perceived to be in control of most risk information flows strengthens this conclusion.

For the usage of specific communication channels, we would suggest to compose the communication platforms based on the available resources, both in terms of time (some channels are more time-consuming than others) and money. The data revealed that the usage of experts as risk information sources is the best way to provide information.

Our data confirmed the mechanism of rationalization. Rationalization can reach very simple to very complex levels. The psychological process can act as a kind of cognitive dissonance reduction. As Marks states: *"Rationalizations of various ad hoc kinds invariably come to the rescue, and scientists are no exceptions"* (Marks, 1990 p.21). Our empirical data will also provide evidence for the fact that experts are perceived as the most credible sources for certain risk information. In any case, it is advisable to set up a small database of experts that are specialized in a certain matter and that can be enlisted to provide information through various news sources (tv news, print media interviews etc.). A website and a hotline are also essential communication channels as they lend themselves perfectly for two way communication flows. Brochures and TV advertisements are very costly and time consuming and cannot be put on rapidly. They can however be useful for longer term informing communication campaigns. For the satisfaction of immediate risk information needs, the quick response communication platforms that offer two way interactive communication flow possibilities (e.g. website, hotline) are the best channels to use to appease the first information needs. These information needs will be countered by information seeking behaviour. We specified the risk information seeking behaviour by defining three types of information seeking. Passive information scanning includes recognizing and processing risk information that one encounters while consulting information sources (TV, newspaper etc.). In the three risk context, this type of information seeking is most performed by the respondents. The second type is event triggered information seeking. This type of

information seeking occurs when something important has happened that relates to the risk (e.g. new terrorist attack, first casualty of the bird flu virus, closure of an important company with major job losses). Event triggered information seeking could be compared to active risk information seeking, but it is not entirely the same as active information seeking is performed on a regular basis and it is not triggered by a specific event in the risk context. Active information seeking is very scarce in the context of terrorism and the bird flu but moderate in the context of the financial crisis. However, we must acknowledge that the percentages of people that answer neutrally to the information seeking items are much higher in the context of terrorism and the bird flu than in the context of the financial crisis. This could mean that people who are not really involved with the risk context (e.g. terrorism and the bird flu) will not have high information needs and have an outspoken information seeking behaviour. On the other hand, the answers of the respondents in the context of the financial crisis are much more outspoken and we notice that the risk information seeking behaviour is more outspoken as well. Concerning the type of information that is perceived by the population as most important to be communicated, the most successful are general and specific information about the risk situation, probability information and information about the potential consequences and guidelines about what to do in case the risk becomes a real threat or turns into a crisis. We interpret these concrete needs of information as a signal to provide information that can satisfy the need for personal information control as a substitute of personal risk control. As most risks cannot be controlled by the individual himself since the unpredictable and untransparent nature, it is assumable that the locus of risk control will shift to a locus of personal information control so that the individual is able to construct his own perceived risk reality.

Our studies revealed that the proportion of people that are actually involved in the risk situations and confirm explicit behavioural intentions and concrete behaviour (protective, information seeking) is small. We could wonder why we should communicate more when these describing results are indicating that only a certain proportion of the population is actually looking for information risks. The answer is that we should especially communicate more effectively by creating customized target based risk communication strategies. We can only create these strategies when we have gained sufficient knowledge about the dynamics that play within the social structures of the society. How does risk information spread and what is the role of opinion leaders within these dynamic processes? We already formulated a theoretically based answer on this question in chapter four (3.) of this doctoral dissertation. It was of course one of our challenges to try to empirically confirm our theoretical propositions by means of our research studies. The need for customized and public oriented risk communication strategies inspired our second research objective.

2.2. Development and validation of a risk information seekers segmentation

The second objective arose from the specific need to construct and implement public oriented and customized risk communication strategies. This need arose from the conclusions that could be drawn from both academic literature as policy documents about risk communication in various risk contexts, as discussed in the theoretical body.
Based on our first study, we managed to confirm a primary empirically based classification of risk information seekers. In the first study, the best solution of the exploratory cluster analysis unveiled four main groups of information seekers: opinion leaders, talking scanners, silent seekers and ignorants. The clustering was based on the main dimensions that we defined on the basis of the literature: information seeking, split up in active seeking, passive scanning and even triggered information seeking, social behaviour and the presence of a specific opinion leadership trait. The four group solution was retrieved in all six quantitative studies. The results of the discriminant analyses confirmed the four group solution and in the four studies, the classification matrix showed that we could scientifically predict the group membership by means of the five predictors in the studies about terrorism and the bird flu. We added two more factors to our list of segmentation variables to perform the cluster analysis in the context of the financial and economical crisis: the convincer factor and the (improved) opinion leadership factor. The cluster analysis with six factors also provided us with a similar four group solution. The subjoined table provides us with an overview of the general characteristics of the four groups of information seekers.

	Active information seeking	Event triggered information seeking	Passive information scanning	Social behaviour	Opinion leadership traits	Convincer
Opinion leaders	High	High	High	High	High	High*
Silent Seekers	Moderate	High	High	Moderate	Low	Low*
Talking scanners	Low	Moderate	Moderate/High	High	High	High*
Ignorants	Low	Low	Low	Low	Low	Low*
* factor only included in financial economical risk study						

Table 137: Comparison of the general characteristics of information seekers (clustering)

These findings were consistent over the six quantitative studies that covered three specific risk situations (terrorism, bird flu and the financial and economical crisis). We extensively discussed the importance of opinion leaders as valuable sources of information in interpersonal communication processes in chapter four (theoretical body). We consider these opinion leaders as primary communication targets as their information seeking behaviour is high (active, passive and event triggered search), they consider themselves as opinion leaders and they talk more about risks to other people than the other groups. This is the most important group of people as it will also be our primary target group in our risk communication programs since the diffused information will reach them more accurately and they will talk to other people about the risks. The percentage of opinion leaders varies

from 15% (bird flu study) to 25% (terrorism and financial economical crisis), so this percentage is quite stable. This figure also corresponds with the percentage of opinion leaders that had been found in previous studies in various contexts: 21% in the ECS study and 22% in the Elmira study and 1 opinion leader for 3 or 4 persons (so 25 to 33%) in the field of political communication (Boone, 1971). The subjoined table provides us with an overview of the percentages of opinion leaders that we retrieved in the six survey studies.

	Terrorism I N=1040	Terrorism II N=160	Terrorism III N=851	Terrorism IV N=1558	Bird flu N=320	Fin/ec crisis N=1578
Opinion leaders	**21**	**21**	**21**	**25**	**15**	**25**
Silent Seekers	24	33	34	34	25	28
Talking scanners	37	20	22	18	33	24
Ignorants	19	26	23	23	26	24

Table 138: Percentages of opinion leaders in the six survey studies

We could consider talking scanners as secondary target groups as they have high scores on the social behaviour and the opinion leadership factors. The problem with talking scanners is that they interact much with others but they do not have an outspoken risk information seeking behaviour. We can expect their knowledge about certain risks to be moderate or even bad. They consider themselves as opinion leaders, but our methodology does not allow us to measure the exact and specific effects of the social interaction in risk contexts. We assume that opinion leaders will be perceived as the 'risk experts' in the personal environments of people and that people will consult this group to gain information and make well-informed decisions concerning behavioural intentions (protective behaviour etc.).
We will compare the socio demographical profiles in the three research contexts in the subjoined overview. The socio demographical profiles were very specific in every risk context. Naturally, the concept of opinion leadership is stable in its roots (main opinion leadership characteristics) but very dynamical and flexible in its profiles for specific risk contexts. The socio demographical profiles of the opinion leaders were stable over the three studies in the context of terrorism. We decided only to use the data of the second study in the context of terrorism to validate the segmentation. We did not profile the opinion leaders because of the limited sample size (n=160, low external validity).

	Terrorism I	Terrorism III	Terrorism IV	Bird flu	Fin/ec crisis
Gender	**Male**	**Male**	**Male**	**Female**	**Male**
Age	40	44	44	47	45
Educational level	Higher	Higher	Higher	Higher	Higher
Income level	n.s.	n.s.	n.s.	n.s.	Higher income

Table 139: Comparison opinion leadership profiles in the five large scaled survey studies

The socio demographical profiles are interesting, but more important are the general descriptive statistics of the primary risk perception constructs. The four groups of information seekers had very specific results for the general concepts, indicating that the groups really had a specific profile concerning risk perception, mental distance, fear and behaviour. The opinion leaders differ significantly from the other groups on the main concepts that surround risk perception. They have significantly lower mental distances and higher risk perception levels, so their perception of terrorism as a potential threat is stronger. Their fear level is higher as well. Higher fear levels are also accompanied with a higher level of behavioural intentions and concrete behaviour. Since we clustered the groups also on information seeking behaviour, it is obvious that their risk information seeking behaviour and social behaviour in the context of terrorism is higher than for the other groups. These results are very relevant as governments should now recognize the fact that opinion leaders, who are the most important risk communication target group since they look for information about the risks to are highly involved with. They talk to others about it, have leveraged risk perception and fear levels (and lower mental distance levels) and higher behavioural intentions. Compared with the risk information needs of the general public, the opinion leaders have much higher percentages for all types of risk information in the three risk contexts. The priorities in information desire are very similar, but both the frequency of risk information search as the perceived importance of all types of risk information are much higher for opinion leaders than for the other information seeking groups. Opinion leaders also have very distinct perceptions about the role of the government as a risk communicator. Their satisfaction with the quantity and quality of governmental information is as low as for the non opinion leaders. On the other hand, concerning the perceived suitability of the potential governmental communication channels to communicate about terrorism, the opinion leaders have significant higher scores on all channels, probably because their greater initial need for risk information. It is also essential to recognize the differences between opinion leaders and the general public in terms of this critical attitude, relating with the fact that they have a higher need to participate in the communication flow with the governments. The latter is another argument to set up and give concrete form to a two-way communication platform that lends the possibility to the opinion leaders to retrieve and contribute to the information pool. Another remarkable difference is their large need for risk information on the one hand but also their need for active participation to the risk communication process. Now we have discovered the four types of risk information seekers and identified our main communication target group, the opinion leaders, we have gained valuable knowledge to create a tangible risk communication strategy. We were able to create their socio demographical profile and to detect their specific risk information needs.

Opinion leaders also have more outspoken needs to actively participate to the risk communication process and contribute to the risk policy discussion. They are the primary public stakeholders in risk policy debates. We extensively discussed the importance of stakeholder participation and more specifically the vital role of the public delegates in risk decision and risk management processes in chapters two and three. The active involvement of the public in these processes also stimulates a long term process to establish trust and

confidence in the risk managers (the governments). We propose to use the opinion leaders as primary potential participants in these risk policy debates. When the confidence in the government as a risk communicator is increased, the perception of the government as a competent risk regulator will be amplified as well. This assumption was empirically confirmed in the three risk contexts by means of multivariate data analyses and structural equation modeling.

2.3. Discovering and proving statistically significant relationships between the key research concepts

The third research objective included the analyses of the linear relationships between risk perception and the related concepts in the specific risk contexts and the validation of the SEM model that scrutinizes the relationship between risk regulation and risk communication. In all three risk contexts we found similar results regarding the linear relationships between the general concepts. The correlation matrices revealed that high levels of risk perception and low levels of mental distance correlate significantly with the need for information and some concrete behavioural efforts like information seeking, concrete behavioural actions (or plans) and social behaviour (talking to others). Fear is also correlated with risk perception of course (same as for fear and behaviour, but weaker linear relationship with social behaviour) and people who have higher fear levels will also look for information about the risk. So people who are more afraid will take more concrete actions and will have a greater need for information and vice versa. It is however remarkable that, in the three risk contexts, fear is highly correlated with risk perception, but not with mental distance. The results of the descriptive statistics stated that there are rather small percentages of people that have high risk perceptions but they also confirmed that the majority of the people have low mental distances towards the risks and do think that the risks are located in their immediate proximity. This contradiction may be an argument to state that many risks are medially and socially constructed. The media can bring the risks in the people's personally constructed risk realities and amplify the risks. But on the other hand, when people are not really and directly confronted yet with the risks, their personal estimates of a direct confrontation with the risk and its consequences will be much lower. So even though the risks are perceived to be near, people are not really afraid to be involved. We allocated this to the denial and the invulnerability biases, as defined by Thompson (1985).

The results in our correlation tables about the governmental communication indicate that it is absolutely necessary to provide enough and qualitative information because these concepts do not only correlate strongly with each other but also with the perceived reliability of the information and the general trust in the government. These strong and significant linear relationships were retrieved in the three risk contexts.

Based on the descriptive statistics concerning the perceived and expected roles of the government in risk situations and based on the correlation outputs, we had reasons to assume that governmental risk communication plays a vital role in the general risk

management process. We wanted to explore and validate potential relationships between the concepts of risk communication and risk regulation. We assumed that effective governmental risk communication can raise the levels of trust in the government as a risk regulator. We tested some structural equation models in AMOS. The models provided us with statistical evidence that the better people perceive the government as a good risk communicator, the better the government will be perceived as a risk regulator. This evidence can be used to convince governments to put more efforts in creating efficient communication strategies that increase the public's satisfaction with the amount, quality and reliability of the provided information. The gain of trust in the government as a risk communicator will result in an increase of trust in the government as a risk regulator, perceived to be able to prevent terrorist attacks. Besides this increase in trust, citizens will also be less critical about the statement that there is no room for bottom-up communication. Moreover, citizens will have a lower need to communicate with the government about risks, probably because they are confident in the fact that the government controls the risk by constructing and implementing concrete and solid risk management strategies. However, the opinion leaders are a special group of people that extensively search information about terrorism, talk about the topic to others and perceive themselves as opinion influencers. The results show us that this group of people will need to communicate for example to exchange knowledge. Governments should take initiatives to create communication platforms to provide enough, qualitative and reliable information to citizens. We also assume that especially the opinion leaders will normally quite rapidly seek access to these platforms to satisfy their need for risk information. The outcomes of the multivariate analyses in the three specific risk contexts have provided an answer to the third research objective.

2.4. Concrete communication guidelines: source credibility and message style

The last two studies were small scaled explorative studies that scrutinized the interaction effects between message characteristics (perceived quantity of offered information, informative versus emotional style, positive versus negative style) on source and information credibility. The studies used a factorial experimental design to scrutinize these effects. From the results of these studies, we could formulate some concrete rules for governmental risk communication. We can state that risk messages should primarily have an informative nature, providing the population with specific and tangible facts and figures. These kinds of messages seemed to have a strong positive relationship with the credibility of the offered information. This relationship seemed to be even stronger for texts from governmental institutes (or governmental spokesmen) than for the article written by a journalist or an interview with an expert, especially when experts act as spokesmen. Especially the perceived amount of information provided in the text appeared to be a very important factor in the creation of messages that are perceived to be reliable. The higher the perceived information quantity, the higher the credibility of this information. This linear relationship seemed to be

the strongest for the governmental communication. We could also confirm this finding in the second study (bird flu).
When we take in account the initial attitude towards the government, especially the critical group of people with a negative attitude towards the government needs messages that strongly emphasize the provision of objective information. To conclude, it is important to raise the impression of a well informed source that has a lot of knowledge about the topic as there was also retrieved a relatively strong linear relationship between the perceived amount of knowledge of the source and the source credibility (especially for experts as risk information sources). The last correlation table took into account the concept of attitude towards the government. People with outspoken attitudes need more information to be convinced as the level of information and especially source credibility raises with the perceived quantity of information that is provided. People with neutral attitudes are probably not strongly involved with the issue and so the relationship is not that outspoken. It will be important to provide a sufficient amount information in order to address both people with negative as positive attitudes towards the government. It is still important to emphasize the need for further research concerning other content and receiver related characteristics in the context of the perceived reliability of the source and message.

3. Limitations , self-critique and recommendations

The first important limitation of our quantitative studies relates to the sampling procedure. As our resources were limited, we could not select the respondents of our studies completely at random from a predefined sampling frame. We decided to follow the quota sampling procedure and let our interviewers (students) select respondents that yield the same proportions as the population proportions on the key identified variables: gender, age and educational level. The main limitations of this sampling procedure are the danger for selection bias as the interviewer selects its respondents subjectively, there is no waterproof method of estimating the standard error of a sample estimate because of the ill-defined procedure for selecting the sample and finally quota sampling could also be suspected to conceal the non-response (Stuart, 1984) as people who are not willing to participate will not be included in the study and results. It is important to bear these critical reflections in mind.

The second limitation relates to the general constructs that are related to risk perception. We have selected some general constructs from the academic literature to relate to
A next critical remark could be that our research results offer strong indications of the social or medial amplification of risks, but our data do not allow us to confirm the precise mechanisms of medial and social constructions of perceived risk realties statistically. We offer a methodology to describe the general concepts that are related to risk perception and risk communication in various risk contexts. We also confirmed some very relevant and apparent statistically significant linear relationships. However, our research designs do not allow us to pass empirically proven judgments about the causalities, about non linear

relationships or about other intervening variables that did were not integrated in the general methodology. In order to expose other potential intervening concepts, we should perform qualitative research that has a more profound character. The output of these qualitative studies would be very valuable, however this research track was not included in our initial research objectives.

The next remark refers to the concept of opinion leadership. We decided to use the self-designation method to identify opinion leaders. We integrated some specific items from existing opinion leadership scales and combined these items with some general risk information seeking items and social behaviour items as our definition of opinion leadership in the context of risk communication. The self designation technique has two main disadvantages. The fact that the respondents fill out the survey themselves induces a selection bias. We could also question the validity of self-reporting. On the other hand, we assume that people who do not perceive themselves as opinion leaders will not fulfill this role and influence other people. Our methodology does not allow us to draw conclusions about the specific information flows between opinion leaders and other groups or individuals nor about the specific degree of influence they have on others. In order to measure the specific impact of opinion leaders on attitudes and behavioural intentions or even concrete behaviour of other people, we should perform studies that integrate more specific research designs (qualitative research) and measurement instruments using expert identification or sociometric techniques. We can also propose an important suggestion for future research. It would be very useful to integrate a comparison of risks and their perceptions in one measurement instrument as this would allow us to set up a list of priority risk issues.

GENERAL CONCLUSIONS

CHAPTER NINE

GENERAL CONCLUSIONS

1. Recapitulation

This doctoral dissertation theoretically and empirically discussed risk as a multifaceted and complex concept. In this concluding chapter, we will recapitulate our most important findings and we will specify the theoretical, methodological and empirical contributions of this doctoral dissertation.

The first challenge we faced was to clearly define the scope of our research topic and to provide a clear definition of 'risk'. From the 'taxonomy of disasters and risks', developed by Wilkins and Patterson (1990), we could distillate that the core definition of risks in our approach to the matter, is closely related to concept of 'opaque' risks. We can state that opaque risks are largely defined by their political and social connotations. We find very strong similarities in the specific traits of opaque risks with the 'new risks' as defined by Ulrich Beck in his new risk society perspective. That is why we used Beck's perspectives on the new risk society as one of the theoretical cornerstones that underlie our approach to the key concept of 'risk'. His sociological perspective on the 'new' risk society is very valuable and has created new looking glasses that can be used to scrutinize risk perceptions on all levels of analysis: cognitive, socio-psychological and sociological. However we did agree with the main critique that his theoretical perspectives lack empirical foundations. Lupton and Tulloch mentioned that very little theoretical and empirical research has been established about the ways in which notions, narratives and knowledge about risks, and certainly the 'new' risks are developed, understood and embedded in the social environments of people (Lupton & Tulloch, 2001). As a response, we concluded that there are many disciplines that scrutinize these issues, but they are all fragmented over several academic disciplines. One of the main objectives of this dissertation was to come to a holistic approach, integrating the most appropriate perspectives from the three core disciplines.

Based on the insights that we had gained, we also added an attempt of a categorization of new risks with their specific traits. Because risk research comprises a very extensive and multidisciplinary offer of approaches, we incorporated and discussed the overview and classification of Renn (1992) and pointed out the fields that are incorporated within the scope of our dissertation. We concluded that the social amplification and attenuation of risk framework (SARF), as developed by Kasperson et al. (1996), is the perfect framework that can serve as a cornerstone for our theoretical and empirical objectives. We had already briefly introduced the ripple effects, as discussed by the SARF model, in the introduction by

applying the idea on the risk of the new 'Mexican flu' or H1N1 virus. However, we have discussed the framework more extensively by means of a concrete example: the risk of terrorism. As 'contemporary' or 'new' terrorism is primarily socially and medially constructed, it is a very nice example of a 'new' risk, as defined by Beck. We discussed the gap between the reality and the perceived reality, based on concrete facts and figures that illustrate that the 'real' threat of terrorism is overestimated. However, we do think that the effects of terrorism may be stronger when it comes to the ripple effects that are induced and amplified by various information agents and social stations, as defined by the SARF. We illustrated that governments are faced with the challenge to inform their population without alarming them. In any case, miscommunication and non communication should be avoided since an information vacuum induces uncertainty and provides the media opportunities to speculate and provide sensational but unrealistic information. Risk communication, especially when it has to be performed by our responsible institutes such as governments and large corporations, is very difficult. Informing the public is a delicate process that should take into consideration the community's 'right to know', their need to know, the obligations to protect this public's mental and physical health, the costs of unnecessarily alarming people versus the benefits of increasing communal awareness and preparedness and the possible repercussions of premature or delayed decisions and actions. The primary objectives of the governmental risk communication strategies will depend on the desired strategic outcomes of the risk managers or government officials on the one hand and on the specific information needs of the various stakeholders that are involved in the risk situation on the other hand. Depending on whether the government has to pick up an advisory, protective or redistributive role, the focus in the information strategy will be on information provision, (re)assurance or involvement. However, we assume that risk managers do not always have the capabilities and the skills to communicate effectively about risks since risk communication training programs are costly and time consuming and the added value of such programs is often underestimated. Risk communication is often perceived as one of the phases in the risk management process. That is why risk communication is mostly boarded out to professional communication organizations. On the one hand we think that is a good thing since these companies possess the knowledge and the skills to construct and implement solid communication strategies. On the other hand we doubt that this approach is satisfactory in the light of the construction and implementation of interactive and public oriented risk communication strategies. Scrutinizing and criticizing several risk management models in our theoretical body made us conclude that communication is a vital element that should be integrated in almost all stages of the risk management cycle. However, the nature, the objectives and the flow of the communication processes may vary according to the specific stage of the risk management cycle. We also clearly defined the differences between crisis communication and risk communication. Risk communication can be both pre-crisis communication in the context of emergency and crisis management processes as risk communication in its purest sense, which has a vital role to play in risk perception management processes. This doctoral dissertation primarily focused on risk perception management and risk communication processes. We mainly based ourselves on the dialogue

perspective on risk communication to formulate various definitions and discuss several risk communication models since this perspective forms a strong base for the receiver-oriented risk communication approach of this doctoral dissertation. We advocate that general risk management and risk communication strategies in particular need interactive and participatory approaches. Both directive (encouraging attitudinal and behavioural changes) as indirective (informational, explicatory) communication strategies can benefit from public participation. Cooperation by exchanging information can create new solutions. Effective interaction can cross time bridges and provide risk managers with information about risk perceptions, concerns and information needs. These beneficiary actions can lead to more efficient risk management strategies and in particular a more efficient and well-considered choice of the most appropriate risk communication strategies. That is why we would advice risk managers to take into consideration the clash between the micro-interests of the involved communities (including various stakeholders), who perceive the risk on a personal and more emotional level, and the macro-perspectives of the risk regulators, who perceive the risk in terms of societal repercussions on an aggregated, statistical data level. This clash often leads to divergent interests and a more difficult decision making process. Defining the public and drawing the profiles of the various stakeholders is a crucial element in drafting risk communication strategies as the dual construction of 'public' versus 'regulators' does not account anymore. The 'public' does not exist; neither does 'the public's need for one single type of information'. The diversity of public concerns and perceptions requires the development of special, customized and targeted forms of communication. We have also confirmed that risk management processes and risk communication strategies that integrate stakeholder participation strongly relate to the issues of trust and confidence. The difference between trust, confidence and credibility is not always clear so we had to consider the specific contexts and levels of analysis that we want to relate to these concepts. However, our extensive literature review about the concepts revealed that there is general agreement that trust is a complex and multidimensional concept that can be analyzed on various levels. We concluded that trust is vital on all levels of analysis and that it is a primary condition to establish and implement risk communication strategies with direct impacts as well as long term effects. But when we formulate it the other way round, we can state that effective risk communication may increase trust levels and mitigate the trust crisis in governmental institutes, primarily by involving the public and stimulating two-way and bottom-up communication. When we related the concept of trust to policy decision making in the context of opaque risks, we concluded that the relationship between risk perception and the attitude towards governmental policy construction is very fragile. The stability of short term and long term trust is undermined by a lack of knowledge about these opaque risks and also due to the uncertainties that are involved. Especially in these risk contexts, the involvement of various groups of stakeholders throughout the entire risk management process is crucial. The participation of the stakeholders can range from passive supervision of the interests of their own group interests to active participation and contribution to the risk management processes. Stakeholder participation can increase trust levels or in some cases, trust levels

are actually becoming less important as the stakeholders can influence the direction, the development or even the outcomes of certain decision processes themselves.

As we have scrutinized the concept of risk from the viewpoint of a communication scientist, we have integrated an extensive palette of theoretical approaches with psychological, social psychological and sociological roots. It is our conviction that the art and science of communicating includes processes that can be allocated to these three main research disciplines. It was one of the main challenges to reconcile crucial theoretical paradigms of these three disciplines. The outcome of this reconciliation has served as a holistic theoretical foundation for our empirical research studies. The theoretical body incorporated elements of three levels of analysis: the individual level, the interpersonal and the sociological level. Bandura's social cognitive theory was an important source of inspiration since his theory merges the cognitive and social perspectives and tries to link them to the behavioural component (Bandura, 2001). We commenced with discussing theories on the individual and cognitive perspectives. Individual risk perception theories such as the psychometric paradigm, the heuristic systematic information processing model and the experiential mode of risk perception clarified the mechanisms that underlie risk perception, but also the role of the media in the construction of risk perceptions was integrated to support our view on risk perception. On the second level, we switched to theories about concrete behaviours in the context of risk. One of the main conclusions was that preventive risk practices are stimulated better by a heightened self-efficacy than by elevating fear. We also focused on the three levels of information behaviour, information behaviour, information seeking behaviour and information search behaviour, and we discussed the framework of risk information seeking model as developed by E. Ter Huurne (2008). The FRIS model involves the particular perception of the risk, the perceived personal control and the involvement of the individual with the risk context. However, our main focus was on the specific types of risk information seeking behaviour as one of the objectives of our empirical studies was to create and validate an information seeker's segmentation. We also discussed the importance of unveiling the specific risk information needs of people in the context of opaque risks. On the second level of analysis, interpersonal communication was considered to be one of the basic elements of the social construction of risk perceptions. The social construction of risks has also been elucidated by several theoretical viewpoints, such as the model of social and medial construction of risks and the social network contagion theory of risk perception. In this perspective, we developed a conceptual model that was a modification on the three basic perspectives on the individual differences perspective, the social relationship perspective and the social categories perspective, three basic perspectives on how individual audience members react on and interact with the mass media and their messages. Our modified model, the 'multi step social interaction perspective', added concepts of interactivity, non personal direct information flows, possibilities of new and interactive information sources and feedback loops. These additions should provide an answer to the needs of the contemporary, interactive information society. Within this model, opinion leaders take up a crucial role as information mediators. The concept of opinion leadership has been scrutinized in various contexts, which proofs its multidisciplinary character, but the

introduction in the context of risk and risk communication is new. We decided to formulate a new definition of opinion leadership that was customized to the context of risk. We defined opinion leaders as 'information transmission agents that seek, receive, interpret and transmit information to other individuals that are in personal (direct) or impersonal (through other channels such as the internet) contact with them. Depending on the specific personality traits and information needs of the people that receive information from or seek information with them, opinion leaders may have an influence on these information receivers'. Based on the outcome of the literature study, that integrated both theoretical as empirical studies, we were able to formulate three crucial dimensions that would allow us to differentiate leaders from non-leaders: information seeking behaviour, social behaviour and interpersonal influence. As we will discuss in the next section, one of the key objectives of our empirical research was to identify the opinion leaders in three different risk contexts and to construct their specific socio-demographical and media profiles. This output may contribute crucial information in the development of effective risk communication strategies.

Our empirical body was partly inspired by William Leiss's vision on the contemporary tradition of risk communication research (Leiss, 1996). In this new risk communication tradition, that was established since 1995, the key research objectives include the creation of tools that can serve effectively in the risk communication audit process. The concrete output of this audit can be stated in terms of good risk communication practices that can contribute to the risk management and risk communication policy developments. The new tradition incorporates a holistic approach to risk research, in which the various concepts that are related to risk, such as risk perception, fear, mental distance towards the risk, media exposure, trust etc. will be related to each other. Naturally, the specific nature of each risk context will lead to shifts in strengths and directions of the relationships between the concepts. So the codes of good communication practices will vary accordingly.

Within this perspective, we developed our key research objectives. Our primary objective was to construct and validate a research methodology that would allow us to scrutinize the various elements of the 'strategic environmental audit', as proposed by Leiss (1996). We decided to define the key constructs that surround risk perception. These key constructs were derived from our extensive literature study, as discussed in the theoretical body. The methodology has also grown organically throughout the entire research process. This process included six quantitative survey studies. Besides the validation of the measurement scales, we also wanted to validate the methodology in various risk contexts as our methodology should be applicable in most risk contexts. The measurement tool offered us a clear audit of the risk perceptions and its related concepts, and it allowed us to identify crucial elements for improvement. As extensively discussed in the previous chapter, the descriptive statistics of these quantitative studies allowed us to draw some general conclusions that transcend the specific risk contexts. One of the main findings was that the proportion of people that are actually involved in the risk situations and confirm explicit behavioural intentions and concrete behaviour (protective, information seeking) is small. This accounted for the three risk contexts (terrorism, bird flu and financial economical crisis).

We posed ourselves the question why we should even consider investing resources into risk communication efforts since these results indicated that the percentage of people that is actually looking for risk information is that low. However, we were convinced that things were not as simple as we firstly assumed. The results of our descriptive analyses indicated that our general 'public' was not heterogeneous at all. This was our key motive to create a segmentation tool that would allow us to identify and profile the various groups of information seekers. The outcome of the segmentation studies would allow us to communicate more effectively by creating customized target based risk communication strategies. We can only create these strategies when we have gained sufficient knowledge about the dynamics that play within the social structures of the society. How does risk information spread and what is the role of opinion leaders within these dynamic processes? We already formulated a theoretically based answer on this question in the theoretical body, but it was one of our challenges to try to empirically confirm our theoretical propositions by means of our research studies. This need for customized and public oriented risk communication strategies inspired our second research objective. Our first study, which was performed in the context of terrorism as a risk, provided us with data for our explorative segmentation. We managed to confirm our classification of risk information seekers. The exploratory cluster analysis revealed four main groups of information seekers: opinion leaders, talking scanners, silent seekers and ignorants. This four group segmentation could be validated in the six quantitative research studies that covered three risk contexts. The results of the discriminant analyses confirmed the four group solution with the five key determinants: active information seeking, event triggered information seeking, passive information scanning, social behaviour and opinion leadership traits. We could also confirm the proposition that opinion leaders could be considered as our primary communication targets since the diffused information will reach them more accurately and they will talk to other people about the risks. The percentage of opinion leaders was confirmed to be rather stable (25%). The opinion leaders differed significantly as for their socio - demographical traits. However, the significant differences for the primary risk perception constructs between the four groups were even more important. These results indicated that opinion leaders consistently had more outspoken results for the general risk perception concepts and also for the specific information needs. The perceived importance of all types of risk information was much higher for opinion leaders than for the other information seeking groups. Besides these specific traits, opinion leaders also had more outspoken attitudes towards the government as a risk communicator. Opinion leaders were more critical in this matter, and they also had a higher need to actively participate in the risk communication process and contribute to the risk policy discussions.

A third research objective was to scrutinize the relationship between risk regulation and risk communication. We used the data from the six quantitative studies to scrutinize the correlations between the key concepts. The results were extensively discussed in the research reports and in the concluding chapter of the empirical body.

We developed three multivariate models that were tested with AMOS. The models provided us with statistical evidence that the better people perceive the government as a good risk

communicator, the better the government will be perceived as a risk regulator. We already strongly emphasized that governments should put more efforts in creating efficient communication strategies in order to increase the public's trust in the government as a risk regulator.
Besides the large scaled quantitative studies, we also performed two small scaled explorative studies that scrutinized the interaction effects between message characteristics and source and information credibility. The results of these studies provided us with some concrete communication guidelines in the specific contexts of terrorism and the bird flu.

2. Concluding remarks

The theoretical and empirical bodies of this dissertation had the primary aim to provide a clear overview of the processes and mechanisms that are involved in risk communication. We have the impression that Belgium does not have a strong risk communication tradition, unlike the Netherlands. The Netherlands have been confronted with several disasters the past decades. The North Sea flood in 1953, the fireworks disaster in Enschede in 2000 are only two disasters that have left strong traces in the collective consciousness of the Dutch population. That is probably the reason why, e.g. with the existence of the Expertise Center for Risk and Crisis Communication (ERC), there is a much stronger risk communication culture than in Belgium. Very often, risk communication is avoided in our country, or it is implemented ad hoc and treated stepmotherly, reducing the effectiveness of the risk communication campaigns.
Our contemporary, western, society is characterized by the presence of many risks that are either very tangible or socially and medially constructed and amplified. We strongly emphasize that citizens have the right to be informed transparently and honestly. Risk communicators and especially governments should find the balance between informing the general population about the presence and severity of risks and avoiding general arousal and collective concern about risks that are objectively not even a real threat. They should educate the population about how to deal with their uncertainties, in the first place by satisfying their specific information needs.
Even though we have not empirically confirmed that the media play an important role in the amplification and attenuation of risks, we can assume that their role should not be underestimated. The media are very useful instrumental tools to diffuse information, but as news media often focus on the sensational and dramatic aspects of certain issues, the reality that surrounds a certain risk is often blown out of proportion. We think that, besides risk regulation and risk prevention, governments should also pick up their role as risk communicators or at least as information mediators. In certain issues, such as terrorism, governments almost have an information monopoly and they decide what risk information can be spread. As the results of our empirical studies demonstrate, people perceive governments to possess this risk information monopoly in various risk contexts. On the other hand, people are not satisfied with the current risk information policy as they think that the

governments do not communicate about the risks enough. This can undermine short term credibility and long term trust in the government as a risk communicator, but also as a risk regulator, since we empirically confirmed this relationship in our six empirical studies. But also for risks that are much more uncertain and opaque, governments should try to actively communicate about these risks to undermine the monopoly of the media, who will very often address the information needs of the public by providing them with their own (sensational) views on these issues.

To conclude, we want to stress the importance of developing tools that may offer us the possibilities to gain information from the population. Besides providing a general overview of the literature about risk perception and risk communication, it was also our aim to construe a tool that may gather this kind of information. Our methodology offers the potential to identify crucial issues to be improved, to assess the general perceptions, attitudes, and concrete behaviours. Our methodology also provides the option to identify the principal communication target groups and discover their specific socio demographical and medial profiles. To summarize, the methodology can serve as an auditing tool that can provide a reliable solution to monitor the crucial issues that are involved in construing effective and receiver oriented risk communication strategies.

We have already mentioned the fact that gaining information about how citizens think about risks and how they actually deal with risks, in terms of protective behaviour or information seeking behaviour, is crucial for the success of the risk communication strategy but also for the entire risk management process. This information should be the starting point of every risk communication strategy. Risk perceptions are very often much more important than the risks as such, as these perceptions will influence the actual behaviour of people, and eventually have their impact on social, economical and political domains in the entire society. In the clash between the micro-perspective of the individuals (probabilities and how risks can affect me and my personal environment) and the macro perspective of the risk managers and analysts (what are the calculated probabilities and estimated consequences), the concrete and tangible approach to risk management and risk communication often gets the upper hand. However, we hope that this academic work has provided enough satisfactory arguments to promote the benefits and value of public oriented risk communication strategies.

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APPENDICES (CD ROM)

The appendices are included on the cd-rom which is added to the dissertation. It includes three folders:

- A folder with examples of the experimental conditions: text conditions and accompanying surveys for the bird flu study (study I) and the terrorism study (study II).
- A folder with the three quantitative surveys in the context of terrorism (2006), the bird flu (2006) and the financial and economical crisis (2008).
- A folder with all crucial governmental documents, guidelines and handbooks for risk communication, especially in the context of governmental risk communication

All databases (available in spss and statistics format) and the outputs of the statistical analyses are available upon request.

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